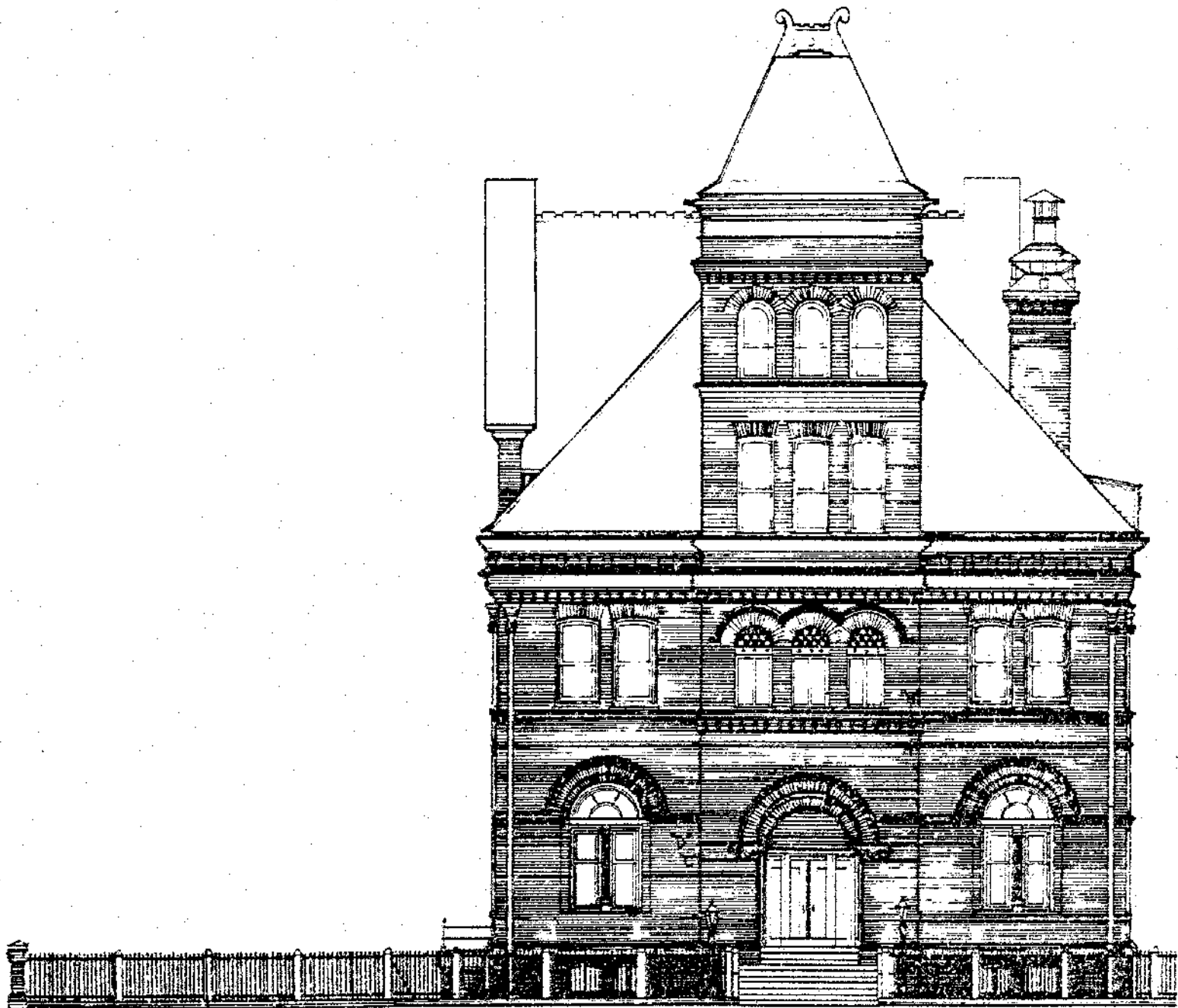


Cyclical Maintenance for Historic Buildings



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As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

FOREWORD

On May 13, 1971, President Richard Nixon signed Executive Order 11593, entitled "Protection and Enhancement of the Cultural Environment," a far-reaching document charging all departments and agencies of the Federal government with responsibility for preserving the Nation's historic properties.

Under the Executive Order, the Secretary of the Interior is responsible for developing and disseminating "to Federal agencies and State and local governments information concerning professional methods and techniques for preserving, improving, restoring and maintaining historic properties." That responsibility has been delegated to the National Park Service, and this report on the maintenance of historic buildings is issued to further the purposes of that Executive Order.

This preliminary report was prepared under contract for the National Park Service, to be part of a series of publications on the technical aspects of historic preservation. These are intended to be used by administrators, architects, and others involved in the preservation and maintenance of historic properties owned by Federal agencies and State and local governments.

Several individuals reviewed the draft of this report and made valuable suggestions for improvement. They include: Dianne Dwyer, Elizabeth Holahan, Laurin C. Huffman II, Ralph H. Lewis, A. Craig Morrison, Ronald E. Nelson, Morgan W. Phillips; and the handbook staff: Laurie Hammel, David W. Look, Carole L. Perrault, and Robert C. Mack, who edited the draft into its present form.

Comments and suggestions regarding additions or changes prior to final publication will be welcomed, and should be sent to Lee H. Nelson, AIA, Preservation Handbook Editor, Interagency Historic Architectural Services Program, Office of Archeology and Historic Preservation, National Park Service, Washington, D.C. 20240.

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PART ONE

PREPARING FOR MAINTENANCE

Maintenance. The very word conjures up images of scrubbing, polishing and dusting. Gone is the glory of architectural investigation and skilled craftsmanship. Here to stay, however, is the real preservation responsibility for the historic property. The fact that maintenance suffers from a low priority image to both the public and the building management does not diminish the true importance of this vital portion of any preservation program.

The skilled person removing dirt from buildings, making routine repairs or adjustments, and in other ways retarding a building's deterioration is performing work which requires skill and sound judgement. Both managerial and financial support are essential if these skilled maintenance workers are to carry out their work adequately, and this support must continue until that day far in the future when methods are developed to give absolute protection from the attacks of climate, chemical and biological agents, normal use, and intentional abuse.

The purpose of this publication is to assist in maintenance planning for historic properties and to explain some of the maintenance techniques appropriate to these buildings which may be less durable than their modern counterparts.

INTRODUCTION

DEFINITIONS

The meanings of the terms used in this book will be clarified by the following definitions.

Preservation is the application of measures designed to sustain the form and extent of a structure essentially as existing. Preservation aims at halting further deterioration and providing structural safety but does not contemplate significant rebuilding. Preservation includes techniques of arresting or slowing the deterioration of a structure, and improvement of structural conditions to make a structure safe, habitable, or otherwise useful.

Restoration is the process of accurately recovering, by the removal of later work and the replacement of missing original work, the form and details of a structure or part of a structure, together with its setting, as it appeared at a particular period of time.

Repairs involve the replacement of deteriorated materials which it is impractical to save, such as broken window glass, severely rotted wood, etc. Repair activities also include the rehabilitation, strengthening or reclamation of items worn to the point that they can no longer perform their intended function. In historic buildings, stock used for repairs should be as close as possible to the original in composition of materials, in method of fabrication and in manner of erection.

Maintenance of buildings is not a single branch of learning or a single trade capable of definition. It is a mongrel science of a varied ancestry: part architecture, part physical chemistry, part management, and more. Maintenance in historic building terms is preservation maintenance consisting of all those day to day activities necessary to prolong the life of an historic property. The maintenance craftsman is an individual with the necessary skill to make minor repairs to and replacements of building elements; this

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skill also includes the knowledge of what not to do.

Housekeeping is that branch of maintenance which removes undesirable or harmful deposits of soil from the surface of building elements. The goal of historic building housekeeping is to remove soil in a manner which does the least amount of harm to the surface treated. Housekeeping is repeated at short time intervals so that soil removal can be accomplished with the gentlest and least radical methods.

HISTORIC BUILDING MAINTENANCE CONTRASTED WITH MODERN MAINTENANCE:

Maintenance priorities vary with the occupancy and the use of a structure. Hospital maintenance has the objective of creating a near sterile environment, and surfaces are designed to be nonabsorbent to minimize bacterial growth. To destroy bacteria, strong chemicals are used; if the building materials are destroyed in the process, it is accepted, because the main priority is cleanliness. The maintenance objective with historic structures is to make the historic fabric last as long as possible. Cleanliness is desirable because building materials deterioration is reduced. Historic building maintenance has PRESERVATION as its goal. It is a highly technical skill and requires attention to detail. Every method and material used must be carefully tested so that the short and long term results can be judged.

PRESERVATION MAINTENANCE:

All objects are in the process of change whether living creatures, inanimate plants, or inorganic matter. Organic materials such as wood, paint and asphalt deteriorate, returning to the earth to nourish the currently growing crop of organic materials. Many inorganic building materials

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try to change from the refined state back to the original oxide, such as rust; other materials, such as stone, which are already oxides, wear away as the result of abrasion, freezing and thawing, etc.¹ A major part of the dust and dirt encountered in maintenance is just small pieces of rock in the process of becoming smaller and smaller. The purpose of preservation maintenance is to slow down the process of change. The techniques of slowing down change are many: cleaning, shielding from sunlight, applying protective coatings, maintaining uniform temperatures, and controlling water both in a liquid and vapor form.

Preservation maintenance holds back deterioration, but cannot eliminate it. The deterioration process can be greatly restrained by maintaining a nearly inert and controlled environment, as with the original Declaration of Independence. With buildings, however, these conditions are not possible without excluding the public from the premises. Cessation of deterioration is impossible, but high quality maintenance will retard it, so that the public can see, feel, pass through and experience our historic heritage.

SUPERVISION

GENERAL SUPERVISION:

If poor maintenance practices occur in the building, the real problem may not lie with the person doing the work. Much of the responsibility rests with the supervisor. A responsible supervisor insists that the personnel be properly trained, knowing and using the proper techniques for each task assigned. With proper training the building will be preserved; lack of training or improper training of maintenance personnel may cause the eventual destruction of the building fabric. In addition, maintenance supervisors must not fall into the trap of responding to pressure from the public or their superiors to do jobs which at the moment seem more important than maintenance preservation.

Good supervisors must organize not only the work but also themselves. In order to organize the work they must make sure that there is adequate equipment and an appropriate supply of materials to do the task assigned. If it is impossible to do the work during periods of building use, then work must be scheduled at a time when the building is vacant. The employee must be trained or instructed to know exactly what is expected, what is the purpose of the task, what techniques might be damaging and that the work will be inspected. The employee must know whether the work will be done without interruption or if the employee may be required to help someone else from time to time. The time and length of rest breaks must be established. Tasks which were not accomplished on schedule should be carried forward and scheduled for another time. A supervisory calendar of appointments should be considered in planning scheduled work. Forward planning must be kept up to date with assignments made for future days. Complaints about the quality of employees work must be promptly investigated. A regular period of inspection should be scheduled during each day and a weekly review should be held in which the supervisor audits work records, including job records, job reports, complaints, logs of work accomplished, and a summary of each inspection. In a weekly meeting with employees, the supervisor should give general instructions and clear the air of any misunderstandings.

SUPERVISION

The maintenance department selects, trains, schedules, equips, supplies and supervises maintenance personnel. Its objective is to keep the historic building in satisfactory condition as efficiently as possible. The maintenance supervisor determines what materials and methods will contribute most to the preservation of the building. If the building contains historic furnishings, curators will be involved also. If maintenance workers have to take their orders from both maintenance supervisors and curators, chaos will result. The solution lies in assigning direct control to one while assuring that the other provides technical support. The curator will keep close watch over the effects of cleaning, informing the maintenance supervisor when methods or frequency of cleaning seem harmful. Close cooperation and open communication between the maintenance and curatorial staffs are necessary.

In general, maintenance duties should not be combined with other responsibilities, particularly in non-museum buildings. In museums, however, it may be possible to combine some housekeeping with other duties. Guides, for example, may do some routine cleaning before or after visiting hours. Costumed attendants may dust or sweep as they carry on informal interpretation and surveillance of visitors.

Supervisors should establish a practice of observing each maintenance employee at work and inspecting at least one completed assignment no less than once each day. This enables the supervisor to guide, instruct, correct or commend workers on all phases of their work as well as to evaluate the finished product. Note that when the only communication from superiors is of negative nature concerning an unintentional mistake or neglect, the employee may concentrate on this past error and neglect other routine tasks.

Someone at a higher level of authority should inspect the condition of maintenance housekeeping and the historic site at regular intervals. During the inspection the superintendent should make notes, check past notes, and make a written report of the activity inspected.

WORK RECORDS:

The maintenance supervisor's work records should include the maintenance manual, kept up to date with the changes approved by resource people or management. They should include a time budget, a materials budget, and a materials and equipment inventory showing the stock on hand and sources for the material. They should outline the daily cleaning routines and job procedures and the cleaning schedules by area and job. The building cleaning schedule, the log of maintenance work done and the list of maintenance work to be done should be included, as well as records of any new material being tested.

STAFFING:

Persons who do maintenance work frequently handle building elements or other objects which are historically important, costly and rare; these elements may vary widely in type and condition. Maintenance personnel, therefore, must be thoroughly reliable individuals, with a well developed sense of responsibility. They must possess the ability to follow many specific instructions. Their skills should particularly include manual dexterity. Preservation maintenance personnel are not janitors, charwomen, or handymen. They are important skilled persons entrusted with helping to preserve part of the national heritage. Consequently, administrators must recruit and train qualified people.

WORKING WITHIN QUALIFICATIONS VS "UPWARD MOBILITY":

It is a supervisory challenge to keep maintenance personnel from performing tasks for which they are not qualified. There is an equal responsibility to provide for "upward mobility" so that maintenance people can be trained to become proficient in one of the paraprofessional crafts.

SUPERVISION

useful to historic properties. It is an unpleasant occurrence when eager and responsible people unknowingly cause harm to a building. To forestall and eliminate this kind of an occurrence, adequate supervision and instruction must be given to keep people from doing work beyond their qualifications. Willing and ambitious employees need greater restraint than those who only do what they are told. Any orientation of newly hired employees must contain a detailed list of those items in the collection or portions of the building fabric which should not be treated by maintenance personnel. This list can be prepared from the inventory of artifacts and the architectural drawings. Among other things, this list should contain: mural paintings, easel paintings, historic wall and window coverings, and most historic leather. In order to effectively administer and initiate a maintenance program a great amount of time must be spent on the training of personnel for "upward mobility." This is not only for their benefit but for the benefit of the institution.

STARTING A MAINTENANCE PROGRAM

GENERAL:

Maintenance is a big responsibility, so it should not be spread too thin.

Although some talented people have acquired a great variety of skills, few have all the skills necessary to perform each task necessary for the preservation of an historic structure. When the primary functions are not being performed, emergencies develop. Historic structures which have a high incidence of "unplanned maintenance" probably have a maintenance plan and direction which is not functioning properly. The reason may be that the tasks which should be performed on a routine or high frequency basis are not being attended to properly. Is the maintenance staff performing work that might be better done by a specialist? In general, it might be said that maintenance work which is done more frequently than every two years is an item for the maintenance staff. If the interval is greater than two years, the item should be individually evaluated, first from a point of view of skill and then from the point of view of the available time of the existing personnel. The following items probably fall within the contract category because of the special skills or equipment: termite control; septic tank pumping; major replacement of roads and walks; repointing; exterior masonry cleaning; reroofing (but not individual shingle replacement); new gutters and downspouts; window and door replacement; replastering; major painting; wallpapering; replacement of all treads in a wooden stair run; elevator maintenance; major mechanical equipment replacements such as hot water heaters, boilers, waterwells, and pumps; replacement of fire detection equipment; replacement of air conditioning chillers and condensers; electric service and distribution systems repair; changing of electrical panel boards; repair of electrical snow melting systems.

STARTING A PROGRAM

UPGRADING MAINTENANCE PRIOR TO RESTORATION:

The first requirement in the establishment of a maintenance program is a thorough understanding of the resource. If possible, the building should be examined by an expert who will prepare an inspection report explaining the physical condition, pointing out defects and their causes. This may take two to four days, or even longer. If an expert is not available this inspection will have to be done by the maintenance supervisor.

As the greatest danger to a building comes from moisture, the inspection generally starts with a careful survey of the roof surface, projections through the roof, and the area immediately below the roof to determine if the roof is providing the necessary protection. Inspected next are building elements on the roof perimeter which are used to take water away from the building, such as downspouts and gutters. Basement and crawl space areas next are examined for underground or surface water moisture intrusion. Other likely areas for the entrance of moisture are holes in the building wall, loose siding, open mortar joints, and improperly adjusted or maintained doors and windows. The maintenance supervisor must take time for the preparation of a maintenance plan; this process may take several months. If the building is to be restored, the plan should program the temporary steps necessary to reduce deterioration. However, in parts of the building which will be removed during future restoration, maintenance only needs to be the degree necessary for sanitation and/or habitability. Expert guidance will assist in deciding what portion of the building fabric and furnishings are of importance so that preservation measures appropriate to their value may be initiated. Even though the focus of this manual may appear to be on maintenance of restored buildings, an historic building needs special maintenance attention whether restoration is anticipated or not.

Unoccupied buildings are subject to a variety of special problems. A vacant property is subject to vandalism and needs mothballing techniques which should be under the direction of an experienced person. It is damaging to the buildings, for example to nail plywood haphazardly over windows, because moisture can be trapped inside if adequate provisions for ventilation have not been made. Unsightly nail holes and trim splitting also

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can occur which will have to be repaired later at great expense. Details of mothballing techniques for historic buildings will be explained in other publications in this series.

MAINTENANCE AFTER RESTORATION:

Once restored, buildings must receive ongoing maintenance. All too often, craftsmen have had to return to a building only a few years after restoration to rebuild portions which have deteriorated due to improper maintenance. There is so much restoration work to do and such a scarcity of talent that these people must be used to their greatest capacity and not be used to duplicate previous efforts.

OUTSIDE REVIEW:

Periodic review of the maintenance program by outside consultants is desirable. They can evaluate more objectively simply because they are not so familiar with the building and the program that they have become used to the unsatisfactory conditions. Maintenance practices become routine and habitual over a period of time because of idiosyncrasies of supervisors, negative comments, maintenance priority, personal work preference, and a tendency to neglect unpleasant activities. There are various specialty experts who can be valuable in evaluating a maintenance program, including maintenance personnel from other historic properties. Each person has a separate point of view, but each person has a definite contribution to make.

PLANNING THEORY:

The amount of maintenance and housekeeping necessary varies from building to building and reflects the current conditions of the building as well as the quality of the

STARTING A PROGRAM

original building design defects as part of the maintenance of the historic fabric. It is not the purpose of historic building maintenance to redesign and correct historic mistakes. Even if it were possible to find a structure that never required repair, it would still be necessary to clean the building.

Cleaning functions generally are divided into three broad categories: policing, routine maintenance, and periodic maintenance. By strictly defining what is to be accomplished in each of the cleaning tasks it is hoped that a uniform cleanliness of all building surfaces can be maintained. The more difficult tasks then will be scheduled on a guaranteed routine basis, eliminating unnecessary interior repainting and floor resurfacing. Without guidance there is a tendency by maintenance personnel to overemphasize some areas and to neglect others. It is hoped that proper planning will upgrade and maintain a uniform level of maintenance which reduces the wear of the building fabric to a minimum. The routines should be changed, of course, by the supervisory personnel when the recommended level of maintenance does not produce satisfactory results.

Cleaning priority is given to the areas through which dirt enters the building, such as doorways and window cracks. Floormats, for example, which clean shoes are a first line of defense; dirt clogged mats spread dirt rather than remove it. Dirt on floors wears away the floor finish; dirt on vertical surfaces and non-wearing horizontal surfaces does not wear, but it may be absorbed into a porous finish. Porous finishes, such as paper and rough wood, hold dirt more tenaciously than hard, smooth surfaces like paint and tile. The following outline gives a list of housekeeping surface priorities in terms of cleaning frequency.

1. Horizontal Surfaces

a. Interior

1. Mats at doors
2. Floor near doors
3. Stairs near doors
4. Traffic runners
5. Stairs
6. Floors
7. Window sills

b. Exterior

1. Mats at doors
2. Porches
3. Steps
4. Walks near entrances
5. Walks
6. Parking lots
7. Drives

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PROGRAM

8. Tops of window trim
9. Tops of door trim
10. Horizontal trim surfaces

II. Vertical Surfaces

- | | |
|-------------------------------------|----------------------------------|
| 1. Air grilles | 6. Window glass |
| 2. Porous surfaces
above grilles | 7. Nonporous surfaces |
| 3. Doors at push plates | 8. Porous ceiling
surfaces |
| 4. Doors hardware | 9. Nonporous ceiling
surfaces |
| 5. Electric switches | |

MAINTENANCE SURVEY

The planning function cannot begin until the planner knows the nature and quantity of the materials to be maintained. A detailed inventory, must be made room by room, exterior wall by exterior wall. The maintenance survey is a method of analyzing work as well as a physical inventory. A suggested maintenance survey form is shown in Appendix D. The architects floor plans, if available, usually can be used to obtain areas of floor, ceiling and wall surfaces; this method is much faster than measuring on the site.

MATERIALS DETERMINATION:

It is important in planning the maintenance operation to know the character of the material to be treated. For instance, if a painted plaster ceiling consists of a new paint film on historic plaster, it should be painted as seldom as possible, because the paint film may already be thick. Additional paint may cause the total paint coating to peel and delaminate. Any washing operation must not be too wet, to prevent soaking through to the old lime plaster. Inspections should carefully watch for bulges indicating old lath nails coming loose. It is suggested that each material to be maintained be examined and recorded. One commonly used recording code is "H" for historic material original to the site; "O" for old materials from another site; "N" for new materials, such as plaster; "R" for reproduction material such as wallpaper; and "S" for modern substitutes like fiberglass.

ITEMS OF SPECIAL ATTENTION:

The back of the survey form should note special attention items. The most frustrating part of building operations is an emergency situation. Another name for an emergency situation is "unplanned maintenance." Emergencies usually involve mechanical items which wear out because of movement.

SURVEY

The forms also should note areas of the building requiring special attention, such as portions of the building subject to wear because of human erosion or areas which are hazardous to visitors and occupants. Also noted should be the areas of the structure which will be visited by the public and the paths which they will probably use between each space. This theoretical analysis later can be checked with actual performance within the structure. This will indicate surfaces which are subject to high wear, especially stairs. If there is a handrail on one side for example, most of the traffic will be single file and be confined to about a foot away from the handrail.

A list of typical surfaces and materials is included in Appendix A,

PROFESSIONAL SERVICES

USE OF RESTORATION CRAFTSMEN, CONSERVATORS, AND ARCHITECTS:

New problems frequently demand new solutions. The use of untried methods may involve the possibility of doing further damage to historic material, so new techniques and materials should not be introduced into a maintenance program without expert counsel. Restoration architects and conservators usually can provide the required guidance or can suggest further sources of information. In order to save both time and money, it is best to organize material concerning the problem prior to calling on the consultant. A clear explanation of the problem will get a quicker response and may save a trip. If the consultant fully understands the problem, it may be possible to give advice over the telephone. If the problem is not an emergency, and many problems are not, it is possible simply to note each occurrence as it is discovered and then call in the consultant on a quarterly or semi-annual basis. By dealing with a number of conditions at one time, the specialist may discover a relationship between them and better corrective action can be accomplished. Similarly, it usually is best to accumulate a number of tasks for the restoration craftsman, rather than calling in the specialist each time a problem requires attention.

Finding people with the necessary skills and experience is difficult in some areas. The organizations listed in Appendix F may be of assistance in this regard, particularly the State Historic Preservation Officer and the State AIA Preservation Coordinator.

OUTSIDE CONTRACT SERVICES:

There are many services which can be performed on a contract basis. Generally, the justification for considering the use of outside contract services is that the work may be hazardous, may require extraordinary skill, may require specialized equipment which cannot be rented, or the existing personnel force is not large enough to handle the work load. Items which are done on a low frequency

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basis may be contracted rather than hiring additional help on a part time basis. In smaller buildings, it may be advantageous to contract work normally considered "in-house," such as floor waxing.

Hazards: Some work, such as window washing from very high ladders and gutter cleaning is dangerous.

Extra Skill: Even though it is necessary to continually train maintenance personnel to increase their effectiveness, there are some tasks which are either too specialized or are performed on such an infrequent schedule that the training would not be warranted. Such items as shampooing of contemporary carpets or cleaning of historic fabrics are in this category.

Special equipment which has a high price and a low frequency of use may not be justified for purchase; machines for waxing, snow removal, tree felling, and a host of other low frequency or seasonal projects may be in this category.

Personnel Overload: In scheduling personnel on a logical basis, the figures may show two and a half people are required. In this case use of a person part time or on a crew contract basis may be advantageous. If the extra work load can be handled by an unskilled or semi-skilled person, a part-time job probably is practical; if the task requires a high degree of a scarce skill, a more satisfactory result probably will be obtained by using contract services.

TRAINING

Training is in progress all the time. It can be either good, indifferent, or bad. Most contacts between supervisors and employees are training. Employees also train each other. To make sure that training is positive and beneficial it must be well organized. Group training is effective and efficient when it is well planned, but if group training becomes a period of "goofing-off" and inattention, then it is a waste of time. Group training, therefore, must be the most organized of all training and it must:

- (1) Present information clearly.
- (2) Demonstrate techniques (hopefully on the job).
- (3) Encourage trainee participation.
- (4) Point out good examples, and bad examples.
- (5) Explain management policies and purposes.
- (6) Explain technical data clearly (use specialists).
- (7) Use effective visual aids.

Preferably the trainer should be someone with practical experience in the field. To be worth the time, talks must be to the point, informative, and on the trainees level, using their language.

EMPLOYEE TEACHING:

Each employee should be expected to do a certain amount of teaching, and to assist in the organized training of new employees or novices. Assigning an employee to teach should be a sign of status, knowledge of the job and its problems, and trust by superiors.

Professional seminars can be helpful to the historic building as well as to the individual. They can be used as a reward for those highly motivated individuals who have proved their industry and responsibility. Craft and maintenance training courses sometimes are available at the National Park Service Training Institute, Harper's Ferry, West Virginia 25425.

Upon returning from a training session, the participant can conduct local training sessions for fellow employees. These sessions provide an opportunity to share the course material and to recognize the course participant to his or her peers.

From time to time employees with building trade aptitudes should be allowed to assist outside craftsmen such as carpenters, painters, plumbers, and other specialists hired to perform projects. Individual training can also take place quite readily during periods of inspection by supervisors.

Training can be summed up by one sentence: "Tell them, show them, and follow through to see that it is done."

GENERAL TRAINING SUBJECTS:

The importance of the historic property should be understood by the employees. Workers who will have contact with the public also should be instructed in deportment, use of proper language, and appearance. They should be motivated to be industrious and to have the proper regard for the safety of themselves, their co-workers and the other occupants of the building. The employee should be trained to be "self supervising" as much as possible, to be able to do a large variety of tasks, and to work alone or as a member of a team. The training should emphasize that maintenance people must set a public example and not cause maintenance problems by tracking in soil; discarding cigarette butts or ashes on floors and grounds; or throwing trash and litter in obscure areas.

Employees should know how to organize their work so that they gather all necessary equipment and supplies at the beginning of the job and store the tools properly upon completion. These organization methods should apply equally to stopping a leak in a cornice gutter or vacuuming a floor.

When skilled personnel with all of the qualifications necessary to do the job are either not available or unaffordable, training is a practical

TRAINING

alternative. It also provides opportunity for upward mobility, as discussed earlier.

Training is of vital importance and a continuous procedure. It should have the following results:

- (1) The property should show evidence of decreased deterioration, and conditions which have caused deterioration in the past should be in the process of correction or under control.
- (2) The public and building occupants should be receiving greater protection from the hazards of maintenance activities.
- (3) Each employee should be able to perform assigned jobs better and with less effort, and to use the tools provided with more skill and effectiveness. The employee should have more respect for his own ability and be of more use to the historic property. The training should result in the employee being headed in the direction of becoming a paraprofessional in the field of historic building conservation.

DOCUMENTS

Supporting documents are helpful in starting a maintenance program even though the building is a standing record. Some of the items listed in this section may seem overly obvious; this material will become an integral part of the maintenance manual, however, and should not be overlooked. These documents are not a substitute for a complete building inspection; instead, they represent a set of instructions to craftsmen, contractors, and others who performed the work. The structure represents the physical evidence, the product of the result of the labors of these people, but the documents serve as a record of the instructions and research made so that the physical evidence could be produced as one now sees it.

Many of the documents may be available in the local library and historical society or may be included in local histories and atlases. Other documentation may be available from the National Register of Historic Places nomination form. Copies of measured drawings and photographs prepared by the Historic American Buildings Survey and the Historic American Engineering Record are available through the National Park Service. State historical societies and State or regional archives are additional places to look for information.

The following documents should be included in the maintenance manual and should be used in preparation of the maintenance plan:

Emergency information: For emergency use it will be helpful to have the following: name of building, (it's important to know the official title); address of building, name, address of business, and home phone number of the person in charge of the structure, and of the maintenance supervisor; telephone numbers of the water, gas and electric utility, and the fire and police departments.

Original drawings and remodeling drawings: These usually are available in the building itself or in the office of the site engineer. In the case of Federal buildings, the drawings may be stored in the National Archives. In the case of non-Federal buildings, the records may be filed with State or local building departments.

DOCUMENTS

If the building was designed or remodeled by an architect, and the person or succeeding firm can be located, it may be possible to obtain a wealth of documents helpful in maintenance planning.

Samples: Samples frequently are submitted as part of the construction or remodeling process for approval of materials and workmanship. Samples usually can be found with the project architect or in the building itself.

Bonds: Bonds are a form of guarantee of replacement of certain products in case failure of the product makes repair necessary. Some bonds run as long as 20 years.

Guarantees: Are generally good for a one year duration. They are important during the guarantee period and are also a record of the name of the subcontractor who installed the work.

Consultant lists: The names, addresses, and telephone numbers for architects or other consultants employed in the course of construction, remodeling, or restoration may be of benefit in preparation for later work. Similar information concerning employees of the architect or engineer also may be useful.

Quantity Survey: Previous contractors might be willing to provide lists of quantities which were used in preparing estimates or ordering materials. This information would be useful in dealing with future independent contractors and the future reorder of materials which have a limited life such as paint coating, gutters and the like.

Restoration reports: If the building has been restored, a wealth of information should be available from the studies conducted in preparation for the restoration project. Research reports, paint studies, project logs, and the completion report should contain much of the information necessary for planning a maintenance program.

Easements, rights of way, and restrictive covenants: Copies of any special consents given to planning agencies, building departments, other governmental departments, utility companies and private individuals should be

DOCUMENTS

obtained in writing. The property also may be subject to regulations imposed by virtue of listing in the National Register of Historic Places or having been the recipient of a grant.

Manufacturers Data: Manufacturers data or brochures which guide the installation mechanic and give detailed instructions on necessary adjustment. These systems include mechanical equipment and devices installed during construction. Typical data includes: electrical data, such as panel boards, motor starters, transformers, and lighting fixtures; heating and cooling data such as boilers, stokers, refrigeration compressors and condensers and hot water heaters; and conveying systems such as elevators, dumb waiters, hoists and cranes.

STORAGE OF DOCUMENTS:

Once the documents have been collected they must be stored in such a way that they can be useful to the people who need them. A system of control also must be developed so that the documents do not disappear.

Architectural drawings are larger than letter size and are not easily reproducible in the copy machines most offices have today. Undoubtedly the architect would run off a set of prints for the use of the historic property. However, this in the long run will not be satisfactory. Blueline prints are not of top quality and fade in time. If not already provided by the architect, a reproducible copy should be obtained which can be used by a blueprint company to make additional print copies. These are quite expensive but will in time, pay for themselves. The size of the architects' drawings mean that special storage facilities will have to be folded. They can be rolled, preferably backwards, but it is better to file them flat in drawers or hang them in a cabinet. Most architectural drawings are 24"x36" in size.

Architectural specification books are printed on letter size or legal size paper, generally bound. It is advisable to obtain 2 copies, one a record copy locked away in a file and the other a working copy. Pages should never be removed from a specification book for temporary use; it's a lot easier to lose a page than a book.

DOCUMENTS

The completion report will be a bound item and is of such importance that it should receive a hard cover binding and should never be loaned without adequate controls and sign out procedures. Anyone requiring information from the completion report should be able to obtain it without removing the book from the record office.

Bonds and guarantees are legal documents. The originals should be kept in a place of security and copies available for maintenance uses. Manufacturers data on installed systems need to be available at the point of repair in case of an emergency. The location may be subject to grease, dirt and moisture which accompanies a mechanical system failure; therefore it would be practical to reproduce these sheets and cover them with a laminate material for protection.

Samples are fragile and should be kept in individual acid free containers and protective packing. Boxes of letter size can be stored like books and should be clearly labeled for easy reference. Heavy samples like stone should not have more than 3 or 4 pounds of material stored in one container. Poloroid prints are unstable and should be copied using a stable photographic process.

New paint samples for color matching may be made on high quality watercolor paper rather than on bulkier building materials such as plywood; it must be remembered, however, that the gloss characteristics of paint on absorbant paper may be different from hard surfaces. Letter size paint samples are convenient to use and can be bound in notebooks.

PREPARING A MAINTENANCE MANUAL

The maintenance manual should form the basis for the entire maintenance program. The work involved in preparation of this document (which is considerable) is an important exercise because it forces someone to make a careful examination of the buildings and grounds and to think about each maintenance task. This type of examination and planning probably has not been done before by either maintenance or management personnel.

There are several resource people who might prepare the maintenance manual: the preservation consultant, the maintenance superintendent, a maintenance consultant, or the person who knows the building best. The preservation consultant may not have practical experience in maintenance or have as complete a knowledge of the building as someone who works on the building full time. The maintenance staff, on the other hand, may be more familiar with normal maintenance and with the building, but is less likely to understand the special problems of historic materials. The final choice of the person to prepare the manual, therefore, will depend on knowledge of the building, maintenance techniques, problems of historic fabric, and budget.

Preparation of the maintenance manual probably will take from two weeks to several months of full time effort, depending upon the particular building. Adequate time, therefore, must be allowed to whomever is given this important task. This time may be shortened if the preparation of the maintenance manual is included in the professional services contract for a preservation or restoration project, since the consultant can prepare much of the maintenance manual concurrent with other work.

Properties with several buildings usually will require a separate maintenance manual for each building and a separate plan for the overall maintenance coordination of the site. If there are several identical buildings, it may be possible to prepare one manual for the group of buildings and to discuss relevant differences as appropriate.

PREPARING A MANUAL

WHAT TO INCLUDE IN THE MAINTENANCE MANUAL:

Much of the material collected while setting up a maintenance program will be included in the maintenance manual. The material presented here, therefore, is in summary form since most of it was discussed in greater detail earlier.

Emergency Information: Appropriate names and telephone numbers of people to contact in case of emergency should be readily available. In some cases, home phone numbers may be appropriate as well as office numbers. This same information also should be posted as a separate sheet near appropriate telephones. Included should be:

1. Fire Department
2. Police Department
3. Property Director
4. Maintenance Supervisor
5. Plumbing
6. Electrician
7. Electric Utility Company
8. Gas Utility Company
9. Water Utility Company
10. Sewer Utility (especially storm)
11. Special maintenance contractors
12. Chart which shows the location of all utility shut-off valves and electrical disconnects
13. Other local requirements

History of the Building: A brief history of the building and its significance will provide a useful introduction to maintenance personnel not already familiar with the property.

Evaluation of the Resource: This section will contain a general description of the physical condition of the resource. More detailed survey forms will be included later.

Catalogue of Documents: All the known documents relating to the building should be included, either by reference or as a copy, including:

- A. Historical Records
 1. Local Histories
 2. County Atlases
- B. Architectural Records
 1. Original Plans
 2. Original Specifications
 3. Reports
 4. Restoration Plans
 5. Plans of Building Additions & Alterations
 6. Photographs
 7. Paint Studies & Paint Schedules
 8. Material Studies
 9. Hardware Schedules

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MANUAL

C. Construction Records

- | | |
|-------------------|---------------------------|
| 1. Samples | 5. Contracts |
| 2. Bonds | 6. Quantity Survey |
| 3. Guarantees | 7. Operating Instructions |
| 4. Equipment Data | |

D. Legal Records

- | | |
|------------------|--------------------------|
| 1. Easements | 4. Zoning Requirements |
| 2. Rights of Way | 5. Building Requirements |
| 3. Covenants | 6. Utility Agreements |

Resource Personnel: The names, addresses and telephone numbers of consultants and contractors who have worked on the building, including:

- | | |
|----------------|---|
| 1. Historian | 4. Curator |
| 2. Architect | 5. Contractors |
| 3. Conservator | 6. Special employees of each of the above |

Safety Considerations: Special safety considerations for the building should be discussed in the maintenance manual. Allowable floor loads and special maintenance procedures for particular portions of the building are among the most typical concerns to be discussed in this section. The Occupational Safety and Health Standards, in CFR 29, Parts 1910 and 1926, should be adhered to.

Sources of Handy Devices: Local sources of special equipment, along with appropriate telephone numbers, will save the requirement for re-locating suppliers with each change of maintenance personnel. See Appendix C for some suggested sources.

Sources of Materials: Suppliers of special materials should be noted for the convenience of people responsible for later re-ordering. Craftsmen or other specialists should also be included.

Survey Forms: The survey forms prepared for each room and for the exterior should be incorporated in some logical sequence.

Treatment Forms: These forms listing specific treatments and frequency for each type of activity should be included, either with the survey forms or in some other logical position. A separate set of forms should summarize the maintenance requirements for the entire building.

PREPARING A MANUAL

PLANNING THE TREATMENT

Many techniques of housekeeping and maintenance are discussed in later portions of this booklet. It must constantly be remembered, however, that these techniques are stated in general terms and may not be appropriate in every case. In every instance, therefore, before deciding on the treatment to be used in the maintenance supervisor must consider whether there is anything in the proposed treatment which could prove harmful to the building or its environment. If the answer is not clear, additional assistance may be required from outside specialists.

In determining the appropriate treatment, safety practices required to protect the workers, other building occupants, and the building itself must be considered.

Once the appropriate treatment has been determined, the maintenance supervisor also must determine whether available personnel have the necessary time and skill; if they do not, the maintenance superintendent will have to decide whether to provide training, hire additional personnel, re-arrange work schedules, or contract for outside services.

CALCULATING WORK TIME UNITS

A variety of professional manuals have been developed to assist in estimating the time required to perform specific maintenance tasks. These figures usually have been developed for commercial and institutional structures of a non-historic nature and thus may be too short for the requirements of historic buildings. Local estimates, therefore, must be adjusted, based on personal observation, staff experience, and the experiences of similar historic properties. Unadjusted work time units for some of the most common tasks are given in Appendix B.

Maintenance tasks which require expensive equipment or special skills should be given to outside contractors, as mentioned earlier. Tasks of this nature should be omitted from the manpower requirement calculations, since they will not require the time of in-house employees.

PREPARING A MANUAL

Before determining the amount of time required to perform housekeeping and maintenance tasks, an attempt must be made to analyze recurring tasks to learn how frequently they must be performed. Appendix A lists many of these types of tasks.

The final results of these calculations will be a listing of time requirements for each type of maintenance activity and a total for all activities. Full-time employees generally work approximately 2,000 man-hours per year, so the necessary staff size can be easily calculated by dividing the time requirements by 2,000. If the calculations show that the staff size is too small, then serious efforts at increasing the maintenance staff budget is in order. In the meantime, work must be planned to insure that no work is done unless it is necessary and the routine work is cut back before essential periodic work is eliminated. The work planning frequency may need to be re-calculated several times in order to utilize the available resources most efficiently.

MAINTENANCE LOG

A complete record of housekeeping and maintenance activities should be kept to point out recurring problems and to assist in planning future activities. The record of routine housekeeping work can be conveniently noted on a copy of the work schedule form. Maintenance work can be recorded in a maintenance log and on the survey forms. Items noted on the survey form should indicate the date the defect was discovered, the date of repair, and the method of repair. An accurate record should be kept of all touch-up painting, including location, color, and individual performing the work.

The log book records work performed and items of expense for repair, replacement and redecorating. It will prove helpful to later planning if the log lists details of the work executed, whether done by in-house or contract personnel, and actual names of the mechanics involved. Any guarantee period which may result from the work also should be noted, along with the length of time the repair should last before additional work is necessary. This information is essential for long term programming and determining future

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budgets. It also will serve as a reminder to amend the maintenance manual if the original estimates prove inaccurate. The log also will indicate unexpectedly repeated repairs, which may be indications of a more serious problem.

WORK SPACE PLANNING

Once the initial planning and the maintenance manual are complete, it is possible to calculate the work space, storage space, and specific tools required to conduct the maintenance program. Maintenance work space must be developed if it was not included in the original planning. When practical, both the work space and storage space should be separated from the primary historic structures to minimize distractions from noise and to minimize fire hazards. An adequate work space should have at least a six foot by eight foot area clear of storage and equipment, to permit protected repair for doors, shutters, and similar items.

When practical, a service closet should be provided on each floor of the building. These small maintenance areas provide a convenient location to store commonly used items and provide a co-location for a service sink, thus eliminating the difficulty of carrying pails of water up and down stairs several times in the course of one cleaning task.

MAINTENANCE TOOLS

The use of the proper maintenance equipment for each job makes the tasks easier and less damaging to the historic building and its contents. Purchase of proper equipment while establishing a maintenance program will insure that the right tools are available when they are needed.

Vacuum Cleaners: The vacuum cleaner is the housekeeping work horse, removing dust far better than anything the early housekeeper had. The purpose of a vacuum cleaner is to provide enough air movement to dislodge the dust and at the same time provide filters and dust bags which are tight enough to trap minutely small dust particles inside the bag. These two requirements conflict with each other. The primary task is to remove dust from hard surfaces, not from carpets. Although carpets need vacuuming, historic fabrics, such as carpets, need modified gentle treatment as prescribed by a curator. For museums, a household canister type cleaner is preferred to an upright or commercial model because it is more convenient when working under furniture and in tight locations. A long cord is an advantage, but an automatic cord reel can cause the plug to whip and dent furnishings.

Carpet Sweepers: (Non-electric) are useful on low pile carpet runners in traffic lanes for frequent pick-ups near entrances during times of bad tracking; however, they are not effective with sand and cigarette butts. A more effective alternate tool for removing sand in runners is a light-weight electric upright carpet sweeper; however, it costs three or four times as much as non-electric.

Floor Polishers: If the property contains several rooms with waxed floors they probably will not be properly maintained without a floor polisher. Use a size adequate for the amount of work. Floor polishers can be dangerously abrasive and destructive if not properly used and controlled; they should not be used on historic wood floors. Most polishers have attachments for rug shampooing which may be adequate for cleaning carpet runners in traffic areas. The machine should have separate brushes for wax stripping, scrubbing and buffing. A wax applicator is required, with a replaceable lambs wool pad.

TOOLS

Ladders: Step ladders and extension ladders are required. Aluminum and magnesium ladders are strong, light-weight, and do not require the maintenance of a wooden ladder. Metal ladders are conductors of electricity and are dangerous to use with ungrounded power tools and around overhead electric wires. Fiberglass ladders, which are safe in the presence of electricity, should be used under these conditions. All ladders should have permanent built-in protection against damaging walls and floors. Two-step ladders should be provided to take down drapes. One of the ladders should be tall enough to reach the ceiling without standing on the second step from the top. As a small ladder is easier to move there is less likelihood of damage to the building and furnishings. A heavy duty extension ladder is more rigid and has less tendency to sway and bounce when extended than light weight models. One with the top section (fly) in the back is easier to extend and climb. Two extension ladders are required in order to have ladder jacks and planks. All ladders should meet the Standards of the OSHA, Part 1910.25.

LADDER LENGTH REQUIRED

Eave Height	Ladder Length
Up to 9 feet	16 feet
10 to 13 feet	20 feet
14 to 17 feet	24 feet
18 to 21 feet	28 feet
22 to 25 feet	32 feet
26 to 28 feet	36 feet
29 to 32 feet	40 feet

Wet Mops: Commercial quality string mops made with long staple cotton yarn should be used. Mop lengths vary from 14 inches to 22 inches long and 6 inches wide. The handle, with a quick release clamp, is 50" long. Two mops are required, one for cleaning and another for rinsing.

Sponges: They are generally cellulose, which have irregular holes and are hard when dry, or polyurethane, which have small evenly spaced holes and are soft when dry. Cellulose sponges are tough when wet and are more satisfactory than polyurethane for cleaning and window washings.

TOOLS

Chamois: 100% oil tanned sheepskin chamois may be used for window washing, but a cellulose sponge can be just as effective to clean the squeegee and wipe away excess water.

Squeegee: Squeegees remove water better than a cloth, sponge or mop. They only work on smooth surfaces. The size should be selected to fit the task; for windows, for example, the squeegee should fit the sash while for floors a much larger squeegee should be used. Squeegees with brass frames generally last longer than other varieties.

Swabs: Toilet bowl swabs of polyethylene yarn or brushes are necessary to clean hard water and soil deposits from toilet bowls, urinals, and sanitary napkin receptacles.

Pails: One-piece molded polyethylene pails are best for general use. They are lighter and easier to keep clean than metal, and are less liable to mar furniture. Eight or ten quart sizes with bail handles usually are adequate, although wet mopping requires two 16 quart pails with wringers and attached casters. Most jobs require two pails. Metal pails should not be used to clean marble because of the iron contamination.

Gloves: There are two types, one to protect the material from the natural oil of the hands, the other to protect the hands from the cleaning material. Cotton gloves are worn when touching uncleaned metal and the metal of historic furniture to prevent etching fingerprints into the metal. Rubber gloves are needed for the use of materials beyond the pH of normal skin. Thin disposable plastic gloves are available and are very handy in doing delicate work.

Brooms: Straight or push brooms have no place in interior historic housekeeping for general cleaning, as they raise and scatter dust. Short handled hearth brooms are best for sweeping dirt into a dust pan, and a whisk broom is best for removing dirt from crevices. For exterior use, push brooms with bristles strong enough to have a chisel-like action should be used on hard surface walks and drives; softer bristle will be necessary on painted porches and steps to prevent damage to the finish.

TOOLS

Dust Mops and Dust Cloths: Both treated and untreated mops and cloths should be available to the maintenance staff. Removable mop heads of one and two foot lengths are best for general use. Dust cloths should be about a yard square and should have non-raveling edges. Both mops and cloths can be rented, thus assuring the optimum treatment of the cleaning materials. Treated mops and cloths should not be used on porous materials, such as untreated wood or marble, or on glass.

Brushes: Various brushes will be required:

- (a) 1" camel's hair brush for items too delicate for a cloth
- (b) 3" soft white furniture brush (a vacuum cleaner attachment)
- (c) Radiator brush for hard to reach places
- (d) Tapered-end scrub brush for corners and stairs
- (e) Long handled scrub brush to wash floors and outside runners

Dust Pans: An upright dust pan and a hearth broom are good to pick up sweepings in open spaces without stooping. When working around furnishings, the use of a small flexible plastic or rubber dust pan will avoid scratching furnishings.

Hand Tools also are important. The following list may be helpful in preliminary acquisition of tools.

Claw hammer	Thumb tacks
Two screw drivers (one large, one small)	Light bulbs
Adjustable pliers	Steel square
Wire-cutting pliers	Nail set (1/16")
Hand saw (crosscut)	Mason's trowel
Two wood chisels (1/4" and 1/8")	"Plumber's friend"
Small flat paintbrush	Three-cornered file
Utility knife	Pipe wrench
Two putty knives, wide and narrow)	Vise grip pliers
Hack saw	Metal shears
Paint scraper	Brace and bits
Folding rule or steel tape	Glass cutter
Clamp - C and bar	Plane with teeth
	Stanley 296 "surform" plane
	Funnel

TOOLS

Flash light & batteries	Portable photo lights
Vise	Carpenter's level
Plasterer's trowel	Shovels
Pinch bar	Steel crowbar
Sandpaper	Flat bar
Seat washers	Rubber tape
Assorted nails	Nuts and bolts
Assorted tacks	Wire - iron
Assorted screws	

STOCKPILES

A carefully selected and properly stored stockpile of special materials will prove to be of great value to the maintenance staff. The building survey will indicate potential maintenance items, some of which may not be readily available; these are the items to include in the stockpile. Most of the items will be accurate historic material or extra reproduction parts, although some commercial items which are difficult to obtain should also be included. Stockpiles should not be over stocked and should not include materials inappropriate to the historic property. Each list will be different, but the following items may be of assistance in developing the initial list.

Paving materials (cobble stones, flagstones, bricks)	Doors if there are a number of similar doors in the building
Building bricks (hand made or molded)	Door hardware
Fence materials (rails, posts, pickets, and gates)	Window sash
Building stone, especially carved pieces (lintels, sills, and coping)	Window hardware
Iron castings	Glass (historic and patterned)
Ornamental sheet metal	Wood paneling and trim
Patterned metal	Wood stair parts
Wood siding (clapboards, shingles, vertical, etc.)	Flooring (wood, stone, brick, glass)
Wood stock if difficult to obtain appropriate species or size	Nails (wrought, cut)
Roofing materials (shingles, tiles, slates, metal, etc.)	Wallpaper
Gutters and downspouts	Touch-up paint
Flashing materials if appropriate types are difficult to obtain	Interior blinds and shades
Shutters and blinds	
Shutter hardware	
Awning cloth and hardware	

CLEANING MATERIALS

HOUSEKEEPING SUPPLIES:

In selecting cleaning materials, the maintenance personnel must constantly remember that the preservation of the historic surface is more important than convenience in cleaning. Any cleaner, therefore, must be used with caution. Materials from supermarkets and janitorial supply houses generally are not suitable for cleaning historic buildings. Labels and sales literature on maintenance supplies seldom describe the contents, which makes choosing safe and satisfactory materials difficult. Gentle cleansers do not handicap the historic housekeeper. If regularly scheduled maintenance care is practiced, harsh chemicals are unnecessary.

Soaps: Water is the best solvent for dirt; soaps help it to penetrate so that the water can reach the oily soil, surround it, release it, keeping it in suspension (emulsification) and float it away. Water alone lacks the ability to maintain soils in suspension.

Soap is produced when alkalis and fats are mixed. The historic housekeeper made soap by mixing lye and surplus cooking fat. An excess of lye would produce a caustic material. Soap is still produced the same way but may consist of a variety of alkalis and a variety of fat materials.

Soaps are good cleaners in warm soft water but even a slight degree of hardness detracts from their performance. The original housekeepers in the historic building had only primitive soaps to clean with so they were forced to use soft water. Even modern soaps work best with soft water. In cases in which a soap is more appropriate than a modern detergent, the soap should be relatively neutral and free from additives.

Detergents: Detergents are oils or fats which are treated with acids. The first detergent was olive oil treated with sulphuric acid and called Turkey red oil in the 19th century; it was used as a dying mordant rather than a cleaner. There are many types of detergents with various qualities. Some are alkaline, some acidic and some neutral. The type in which we are interested is nonionic because it is the safest, being neutral (pH 7).

CLEANING MATERIALS

Strongly alkaline or acid cleaners are destructive materials and have no place in the cleaning routine of historic buildings except after careful testing on the materials to be cleaned. Janitorial supply houses usually will not be able to furnish nonionic commercial detergents. To obtain materials of known ingredients it may be necessary to deal with a chemical supply house or to consult a conservator. The person who purchases supplies must be able to read labels and know what the chemical ingredients mean in terms of harm or benefit to the building. If it is not possible to determine ingredients then it is not safe to purchase the product.

Abrasives: Some soaps and cleaners contain abrasives such as volcanic ash, sand, talc, or borax to increase the mechanical action. Tests can be made to determine whether the action of the abrasive material is harmful to the surface on which it is used.

pH:

Discussion of pH: pH is a measure of the acidity or alkalinity of a material. The acid properties of a solution are due to the concentration of hydrogen ions; alkaline properties are due to the concentration of hydroxide ions. Pure neutral water has a pH of 7. Acid solutions have a pH value of less than 7 and alkaline solutions have a pH of more than 7.

Test for pH: Litmus paper can be used to determine pH within two points. It is a standard chemical supply house item.

PART TWO

MAINTENANCE TECHNIQUES

The following section of this booklet deals with specific methods of maintenance and housekeeping for historic buildings. Its purpose is not to answer every problem, but rather to introduce maintenance personnel to the range of concerns in caring for a historic building and to give general guidance in a variety of situations. It is worth repeating that this section cannot provide all the answers. What is appropriate in most cases may be exactly the wrong procedure in some cases, so complete evaluation of each specific building must be made. If there is any question concerning the appropriateness of a specific technique, either an outside specialist should be contacted or extensive testing should be conducted prior to approval of the technique.

Before discussing specific techniques, it will be helpful to explain some of the causes of deterioration.

DUST AND DIRT

Maintaining a historic structure in a clean condition is its first line of protection. Without housekeeping, accumulating dirt will assist deterioration by abrasive and chemical activity, pollutants will build up corrosive concentrations, and conditions favorable to the breeding and feeding of insects and mold will develop.

Dirt contains a variety of substances; mineral particles, cellulose and animal fiber, and oily materials are most common. Mineral particles (about 55%) can be removed by dry cleaning methods such as a vacuum cleaner. Cellulose and animal fiber hold onto surfaces by electrical forces and also can be removed with dry methods. Greasy and oily materials, however, must be dissolved or emulsified to be removed. This requires wet cleaning.

Soil accumulated on building materials and contents either by human agency (touching, spilling, marking, etc.) or as airborne particles. Human agency soil varies from body oils to food to felt tipped markers and normally requires wet cleaning methods. Airborne particles are brought in through open windows and doors and are moved about by drafts or by the ventilating system. The number of these microscopic particles in the air ranges from 50,000 to 2,000,000 particles per cubic foot! ² These particles usually can be removed through dry cleaning.

HUMAN EROSION AND WEAR

Human erosion is the wearing away of a building through human actions. Human erosion may be caused by abrasion through use, from vibrations due to mechanical systems or traffic, and by removal of historic fabric in the name of "restoration" or "preservation." Only the first of these, wear through use, is subject to modification through the use of appropriate maintenance techniques.

Some erosion is readily visible even to the layman; worn floors, dished stair treads, and threadbare carpets are common examples. Other erosion, such as wear of hardware, may be less noticeable but can cause additional damage; worn hinges, for example, may allow a door to droop and scrape the floor.

Abrasive erosion takes place not only because of the contact between two surfaces but also because of small particles of grit which aggravate the abrasion. Controlling dirt, therefore, can be a significant part of controlling erosion.

There are several basic approaches to dealing with erosion. The simplest, though not necessarily the most desirable, is to let the surface wear, recognizing that the material will require replacement in the future; maintenance supervisors will need to develop stockpiles and to program for funds sufficiently in advance of the future replacement that the project can be carried out when required. A second approach is to keep the source of erosion away from the surface completely; this normally requires that the resource not be used. A third approach is to place a replaceable wearing surface over the more delicate surface, accepting the visual intrusion as the least objectionable alternative; runners, mats, and special slippers are examples of this approach.

HUMAN EROSION

FLOORS

This erosion depends greatly upon tracked-in dirt which, in turn, depends to a great extent on the exterior paving or lack of paving. The first line of defense, therefore, is to place some type of device at the entrance to remove dirt from the soles of shoes. The most common device is the familiar "Welcome" mat shoe cleaner; more extensive devices such as runners may be desired to protect more delicate areas. In some cases it may be desirable to have visitors put on soft soled slippers in order to protect extremely delicate features. Frequent cleaning of the mats or other devices is essential, for dirt choked mats deposit dirt on shoes rather than removing it.

Rainy Days: On rainy days, additional mats placed outside on walks and porches are the surest way to protect interiors. These mats can be eliminated during those periods of the year where dirt production or dirt introduction into the building is lessened.

Materials: It is doubtful that people will use foot scrapers unless they are unfortunate enough to have stepped in a mud puddle. Good dirt removing matting should be placed outside the building. There are some materials of an indoor-outdoor carpet nature which may be used. Dirt should collect within the mat itself. Open back matting and unbacked carpets allow the dirt and abrasive materials to go directly through the material; weight on the material above then can scratch the floor. There are great varieties of plastic runners available which vary in design and plastic weight. Plastics should be used with caution, for some plastic materials give off chemicals which can damage the surface below. Some mats have reinforced edges, some are perforated, some have molded dots or other protrusions which are designed to prevent slipping. Mats with protrusions should not be used if there is a possibility of making dents in the floor below. Before committing a large expenditure for protective floor materials, various kinds should be tested in an effort to find the best possible compromise between expenditure and protection.

OTHER AREAS

Other areas frequently subject to human erosion include the bottoms of doors (which may be kicked open), the paint around light switches, stair railings, and any other areas people are likely to place their hands or feet. The protection and repair of several of these areas are discussed in other portions of this handbook.

MAINTENANCE OF WALLS AND CEILINGS

Unless covered with fabric or paper, most walls are likely to be coated. The coat may be durable like paint or may be water-soluble and fragile like calcimine or whitewash. Although an estimated 80% of the dirt entering a building is brought in on footwear, a part of this becomes airborne, particularly if mats and floors are not cleaned promptly. The volume of airborne dirt which comes to rest on walls and ceilings is a small part of the total, but it builds up slowly on all surfaces and is often unnoticed except around radiators and air grills. Other dirt is deposited on walls by the touch of people, objects or furniture. Walls and ceilings are cleaned by both dry and wet methods. The maintenance manual must state which surfaces have historic coatings and which have been repainted with either reproduction or modern paints; it also should indicate that historic materials should be cleaned by a conservator or other knowledgeable person whereas modern materials may be cleaned using the methods discussed in this section.

HISTORIC METHODS

Dry Methods: The historic housekeeper used brushing, wiping or blowing to remove dust from building surfaces.³ This procedure did keep the soil from becoming embedded in the surface, but unfortunately the only dirt that was removed was that which clung to the tool or was blown from the surface. The historic housekeeper, because of less efficient dry methods, was forced to rely more on washing than is necessary today. The historic housekeeper used painters' brushes on window sills, cornices and ledges.⁴ Feather dusters on walls were recommended after covering the sofas with cloths. An alternative to the feather duster was a bellows.⁵ Walls were swept with a broom used only for that purpose. Sometimes a broom was covered with a cloth or a specially prepared cloth bag. Cobwebs were removed by broom.⁶

Wet Methods: The existing published sources discuss materials rather than methods. However, the authors did seem well aware of the problem of streaking when

WALLS AND CEILINGS

using wet methods on vertical surfaces and used sponges as well as cloths. Some of the more exotic cleaning solutions recommended were potato water and fine sand, beer, beeswax and sugar, bullock gall and whiting, and diluted ammonia and hard soap.

MODERN METHODS

Routine Dry Cleaning: The routine dry methods of dusting should be done with a vacuum cleaner and a round, soft, long haired, dusting tool or a treated dust cloth. Dust routinely all the ledge type horizontal surfaces, tops of baseboards, window sills, door panel moldings, tops of mantels, tops of door and window trim, and tops of doors should be dusted routinely. Ledges above eye level should not be left for periodic cleaning because the dirt accumulation rate is much faster than on walls or vertical surfaces. Care must be taken when dusting not to rub adjacent horizontal surfaces, leaving abrasive marks on walls or smears on glass. After a heating season it will be evident where wall dust buildup accumulates above radiators or wall grilles. If these can be handled with a vacuum wall brush without objectionable light spots appearing on the wall, periodic wall dustings may be spaced further apart.

Periodic Wall and Ceiling Dusting: This project requires preparation. For wall cleaning alone furniture must be moved away from the walls to allow work space; three feet should be ample. If ceilings are to be dusted, furniture should be set compactly near the center of the room so that it does not have to be moved again for ceiling cleaning. Wall hangings, decorations, pictures, drapes, curtains, roller shades, etc. must be removed.

A vacuum cleaner with a wide dusting brush is used for both wall and ceiling dusting. Prior to dusting, cobwebs should be lifted outward and upward so that they do not smear. The dusting should start in a corner at the floor and move upward to the cornice. A light, even touch with overlapping strokes provides the best cleaning. It is important to keep the brush clean to avoid streaks. Ceiling cleaning should follow the same procedure.

WALLS AND CEILINGS

Routine Wet Cleaning: Spot cleaning removes the smudges and mars left by hands and bumps from furniture and other objects. The areas requiring the most frequent spot cleaning are around light switches, thermostats, doors, the wall side of stairs, bell pulls, wall sconces, etc; dust also may collect around radiators and air grilles. The spot is rubbed gently with a clean damp sponge to wipe away the dirt, then dried with a clean wiping cloth. If water alone does not remove the spot, it may be necessary to use a non-ionic detergent solution followed by damp rinsing and drying. The spot should be blended into the remaining surrounding surface. If blending is required, it may be an indication that cleaning is not being performed properly or with sufficient frequency.

Periodic Washing: Complete room preparation as previously described is required prior to washing of walls and ceilings. Materials required include ladders, drop cloths, non-ionic detergent, 2 buckets (solution and rinse), soft water (if available), 2 sponges (solution and rinse), and a supply of dry wiping cloths. Walls first should be dusted as previously described.

The sponge used for the cleaning should be wet but not dripping to prevent water from streaking the wall. The cleaning should begin at a lower corner of the room and should include the baseboard. First, a wall section of 5 to 10 square feet is moistened without rubbing. The moistened section then is rubbed with sufficient pressure to take off the dirt. Thorough rinsing must follow immediately; two rinsings may be necessary to remove all the cleaning solution and dirt from the wall. The cleaned section then is wiped dry. The rinse water should be changed frequently.

The process of wetting, rubbing, rinsing, and drying is continued around the lower portion of the room with each section overlapping the preceding section slightly. The upper portions of the room and the ceiling are washed in the same manner, working from a step ladder. Painted woodwork should be washed with the walls.

There is some difference of opinion as to whether it is best to wash a wall working from the top down or from the bottom up. Bottom up is safer because solution streaks running down on a dirty wall cannot be removed. The important thing is to work dry enough to avoid drips.

WALLS AND CEILINGS

Limits to Cleaning Methods: Only oil based paint varnish, and modern coatings can be washed safely.

Surfaces such as calcimine and white-wash which can be damaged by water should be cleaned only with dry methods; no wet methods should be permitted. Some restorationists and architects use an imitation whitewash that can be washed with care. These coatings were traditionally removed and recoated. Wet methods for other materials may be tried after receiving advice from a conservator.

MAINTENANCE OF PAPERS AND FABRICS

HISTORIC METHODS:

Fabrics were dusted with a soft brush or whisk broom, and sometimes blown with a bellows. When the winter fabrics were changed during house cleaning time (April and October) the off season, bed hangings and carpets were shaken outside or out the window. Expensive fabrics were dry cleaned by brushing with one of the following mixtures: fullers' earth softened with hot water and a little turpentine; wheat bran and powder - blue; or dry bread. Pleats were unpinned and the fabric was laid on a large table, the mixture was spread with a soft flannel cloth, and carefully brushed.^{8,9}

Wall paper was routinely dusted and was periodically dry cleaned. The cleaning materials included stale bread cut into chunks, a stiff dough made with flour and very little water, or half baked bread. These mixtures were carefully rubbed with downward strokes only, overlapping each stroke.^{10,11}

MODERN METHODS:

Historic fabrics and paper wall coverings are so fragile that maintenance is not safe without the advice of a conservator. Even special techniques of light routine dusting must be carefully controlled. Vacuum cleaner suction can break brittle old fibers and should never be used. Reproduction wallcoverings may be so accurate that they are made with water soluble pigments which cannot tolerate water at all. Protection from human erosion is the best solution of historic or historically accurate fabrics and paper, although commercially available wallpaper cleaners may be suitable for modern papers.

MAINTENANCE OF UNCOATED WOOD

HISTORIC METHODS:

Unfinished or unstained wood is mentioned in the house-keeping literature in reference to floors, wainscots, and furniture. Floors were routinely swept and periodically scoured with sand. Spots were removed with lye. Unpainted wainscots were routinely dusted and periodically washed with beer. After washing they were treated with solutions of ale and beeswax followed by polishing with a soft rag.

MODERN METHODS:

Dirt can become embedded deep into unpainted wood. Routine dusting with a vacuum cleaner at full suction will dislodge dust before oily residue can be absorbed by the wood. Treated mops or dust cloths must not be used on unfinished wood.

Floors: Damp mopping using clear water may be used for periodic cleaning. The wood must not remain damp any longer than necessary. If necessary, the floor can be scoured yearly with soap and brush using as little water as possible. Dirt between floor board cracks should be removed with a blunt wood or metal tool.

Walls and Wainscots: Like floors, these surfaces should receive routine dusting and periodic damp wiping. The wall washing techniques described earlier should be modified to keep the wood as dry as possible. Vertical surfaces may be waxed with microcrystalline wax or paste wax.

MAINTENANCE OF FLOORS

Building floors received most of the abuse and 80% of the dirt brought into the building from the outside. Some methods used to maintain floors by historic housekeepers were destructive to the floor material itself; to preserve the building, harmful methods will have to be eliminated. The goal of floor maintenance is to arrest deterioration while preserving the historic appearance. Some modern maintenance methods can be used on historic materials with only minor modifications. Contemporary methods can be used in storage, and utility areas or other areas with non-historic materials.

HISTORIC METHODS:

Many wood floors had no finish of any kind and were cleaned using harsh methods. Grease spots were scoured out of wood floors with hot lye and sand, working with the grain. Sometimes a poultice of clay or lime was put over the spot and left all night and then rubbed off. To clean bare floors, sand was thrown hard against the floor to attract dust.¹² Water was used as little as possible on wood floors because it tended to darken the wood.¹³ When wood floors were scrubbed early housekeepers used such combinations as Fuller's Earth, sand and lime water or soda followed by a dry rub of hot sand or soft potassium type soap.¹⁴ In 1877 some authorities were still using Fuller's Earth and sand to scrub bare floors.¹⁵ They were conscious of the importance of thorough drying after mopping. For dusting, a well rung out mop was used to pick up dust. Specific instructions were given for sweeping with gentle strokes to avoid spreading the dust. Dusting was sometimes done with a specially prepared flannel bag placed over the broom. Sometimes water was sprinkled on the floor to lay the dust prior to sweeping.¹⁶ Carpets were taken up and taken outside and beaten. While the carpets were being cleaned, the floors underneath were scrubbed.¹⁷ One reference advocated scrubbing with Borax and spreading tobacco leaves underneath the carpet as a protection against carpet beetles.¹⁸ Varnish finish was cleaned with clear water, water with ammonia, or water with a little kerosene in it. One reference in 1898 recommends cleaning of varnish

FLOORS

with a cloth soaked in gasoline and states that there should not be any lamps burning at the time of this operation.¹⁹

Marble floors could be cleaned with soap and water, but sand and water was preferred. References, both English and American, gave a mixture recipe for cleaning stone which was prepared using size, stone blue water, whiting and pipe makers clay. This mixture was applied with a damp cloth, then dried with flannel and a brush. Encaustic Tiles were damp dusted with a damp cloth wrapped around a broom.

MODERN METHODS:

Runners and Mats: The purpose of runners and mats is to collect dirt, to keep it from going further into the building. A dirty mat will not accomplish the purpose for which it was intended. Mats and runners should be vacuumed or swept as often as necessary depending upon the time of year and current wet weather. More thorough cleaning can be wet or dry depending upon the amount of dirt. They should be removed from the building, then vacuumed and scrubbed with a brush and a detergent solution. The floor below the mats should be cleaned each time the mats are removed using at least dry methods.

Dry Cleaning: It is no longer necessary to use a broom on interior floors. They can better be swept with a treated dust mop or vacuumed. Dry mopping requires a dust mop, radiator brush, hearth broom (to remove dust from hard to reach places), dust pan, and putty knife (to remove sticky material). In most cases the dust mop should be furnished with a treated pad to hold the dust rather than scattering it. Mopping should be planned to require as few steps as possible. If the area to be swept is less than 8' wide, the mop should be pushed in parallel paths the full length of the room, stopping only to use the radiator brush or putty knife. When the space to be mopped is wider than 8', the mop can be swung in an arc taking in an area as wide as comfortable for the arm reach of the operator. The mop should be lifted from the floor only to transfer the accumulated dust to a dust pile. Treated mops can be used on most hard surfaced floors, such as wood, linoleum, concrete, and most stones. They should not be used on marble, terrazzo, fabric, or fiber mats.

FLOORS

Vacuum cleaners are particularly useful on rough or textured surfaces like brick, fabric, and fibers. Earth floors and other loose or friable surfaces can best be cleaned by a vacuum cleaner set at very low suction. If any wet or damp surfaces are to be vacuumed, the vacuum cleaner must be designed for wet surfaces to avoid the danger of electrical shock.

Damp Cleaning: Damp mopping is used to supplement treated mopping and can be used on all hard floor surfaces. Damp mopping is a periodic cleaning method and is used more frequently than wet mopping. Equipment required is one string mop, a mop bucket, wringer, and soft water (if available). Furniture should be moved and protected as required. The room should be dry mopped thoroughly prior to damp mopping.

First the mop is wet and wrung nearly dry. Mopping should start by drawing the mop close to but not touching, the baseboard. Work back parallel to the baseboard using long continuous side to side strokes and keeping the mop heel on the floor and the strands spread. The mop should be turned after each four strokes and rinsed after eight strokes. Change the water when you can no longer see the bottom of the pail. Do not touch the baseboard, furniture or rugs with the mop. Work around furniture legs and in room corners by holding the mop strings in the hand. If clear water damp mopping does not satisfactorily remove dirt embedded in the finish, consideration can be given to damp mopping with a solution of nonionic detergent in warm water followed by a clear water rinse. This is a three phase operation. The solution is put on with a slightly wet mop and is picked up with slightly wet mop rinsed in clear water; the floor then is wiped dry with the mop wrung as dry as possible.

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Wet Mopping: Wet mopping is used only on marble and other stones, ceramic tile, terrazzo or concrete; it must not be used on wood, historic linoleum or oil cloth. Water on wood stains it dark. Historic or reproduction linoleum and oil cloth should have a treatment prescribed by a conservator.

Materials required are two string mops, three buckets (one with a wringer attached). Detergents and other cleaning materials should be carefully selected for compatibility with the floor surface. Acidic cleaners must never be used on marble or concrete.

Wet mopping procedures involve wetting the floor, agitating the cleanser, and rinsing. Begin by lifting the solution mop above the bucket and letting the excess material drain back into the bucket. A space about 9' by 12' is outlined with the solution mop. The mop then is wet again, and the outlined space is mopped with swinging strokes, proceeding slowly to avoid splattering the baseboard or furnishings. The area should be mopped twice to agitate the cleanser. Corners should be scrubbed with a tapered end brush or hand held mop strands. Wring the mop dry in the empty bucket and go over the area for the third time to pick up the solution. The cleaning solution should not lie on the floor longer than ten minutes. The second mop is used to rinse the floor with clear water. The floor should be rinsed before dry spots start to show. Each area should be rinsed two times. Wring the rinse mop dry in the empty bucket and pick up the rinse solution. The mops should not be mixed during the mopping procedure. Wringing into the third bucket prevents the cleaning solution and the rinse from getting too dirty.

Floor Scrubbing: When even wet mopping does not do an adequate job, some floors can be scrubbed with an electric polisher fitted with scrubbing brushes. Scrub the floor while the cleaning solution is on the floor. Do not let the cleaning solution remain on the floor more than ten minutes. Places the polisher cannot reach must be scrubbed with a tapered end hand brush. Pick up the solutions and rinse in the same manner as described for wet mopping. Floor scrubbing is a drastic treatment; use it sparingly. In each case consider the age, the softness, and the effect of cleaning solutions running through joints

FLOORS

or cracks in the floor into supporting substrate. Check with a conservator when in doubt as to the possible effects of scrubbing.

WAX COATINGS:

Wax is an important maintenance agent which protects against material abrasion and wetting. Its advantage is that it is easy to apply and easy to remove. The preferable types are those which can be removed by water or turpentine. Some sophisticated modern waxes formulated for long wear and for high production commercial use require special strippers which most often are not appropriate for historic materials because the ingredients cannot be readily determined. Some silicon waxes can only be removed by abrasion.

Non-Skid Paste Wax: This wax is applied to wood, cork, linoleum and masonry materials with a dampened, clean soft cloth. Place a small amount of paste wax on the cloth and wipe it over the floor leaving a thin and even coating. It is not necessary to go right to the baseboards because the buffing operation will spread the wax to the edges of the room in every place except the inside corners. After polishing, sweep the floor to pick up stray wax grains that are loose on the floor. Wash all equipment before the wax hardens. Paste wax is recommended because it can be reconditioned without stripping by applying more wax and rebuffing. The solvent in the paste wax reconditions the previous coat and minimizes buildup. Paste waxed floors are stripped with a coarse cloth saturated in turpentine and hard rubbing. If dirt spots remain, scrub lightly with a piece of 000 steel wool. Change cloths and steel wool when they are clogged with old wax. Work in a well ventilated room. Observe safety rules as both the turpentine and the wax are flammable, and the fumes can trip an ionization smoke detection system. The soiled cloths must be stored in a metal safety container to guard against spontaneous combustion.

Water Emulsion Waxes: These waxes are appropriate primarily for maintenance of non-historic materials in areas such as offices and shops. Water emulsion waxes generally are inappropriate for historic materials. These waxes are very durable and require special procedures for stripping.

MAINTENANCE OF CARPETS

Cleaning of historic and reproduction carpeting should be conducted only in accordance with the directions of a curator. Maintenance personnel must be trained in the precautions and specific methods by the curator prior to attempting any type of cleaning treatment. Specific material, therefore, will not be given in a handbook of this type.

Contemporary carpet materials, other than reproductions, can be cleaned using contemporary equipment and techniques. Provision for carpet sweeping, routine vacuuming, spot removal, and periodic shampooing should be included in the maintenance planning. Particular care must be taken to prevent damage to historic flooring materials below the carpet.

MAINTENANCE OF INTERIOR MASONRY

HISTORIC METHODS:

Marble floors were cleaned with soap and water or with sand and water,²⁰ while stone floors were cleaned with a mixture of size, stone blue water, whiting and clay moistened with water.²¹ Tile floors and hearths were cleaned with a damp cloth and clean water or soap and clear water.²² The instructions for cleaning fireplaces were numerous and greatly detailed. Fireplaces required an enormous amount of work to clean and maintain, so any help to the housekeeper from new materials and methods was appreciated. Brick, being porous, could be attacked by the corrosive elements in wood ashes and by the effects of heat. To make bricks less porous and more easy to clean in the ash and hearth area, they were daubed with red ochre mixed with either water or milk after washing. Sometimes a mixture of black lead and soap was applied to provide a glossy surface to which the ashes would not stick so readily.²³ In the 1860's some people began painting the surface as it was longer lasting. Placing a zinc sheet above the ash line reflected the heat and provided an easier to clean surface. A special, small piece of steel was used to clean the ashes from the inside corners of the fireplace. Stone hearths and freestone or brick jambs were cleaned with cool water and soap, or wet sand and a brush.²⁴ Sometimes stone was rubbed with lamp oil to make it less absorbent. A thorough method which was claimed to make the stone look like new involved a mixture of soap and stone powder obtained from the stone cutters which was carefully rubbed into the stone.²⁵ Marble cleaning ranged from daily dusting to the use of corrosive materials, including hot water and soap lather, a mixture of soap and oil, a mixture of pumice and crab apple juice, and a mixture of muriatic acid, ox gall and soap.^{26,27} These methods are unnecessarily destructive and should no longer be used.

MODERN METHODS

Fireplaces: A fireplace in use involves handling fuel, removing ashes and keeping fireplace dirt under control. Routine methods, regardless of the fireplace

INTERIOR MASONRY

material, require dusting the hearth with a vacuum cleaner or a treated dust mop (treated dust mop should not be used on marble). Periodic methods require damp mopping before the hearth material becomes dull. Wet mopping and scrubbing will occasionally be required on a working fireplace to remove stains caused by the fire.

Stain Removal: Grease can be removed from stone by applying a petroleum distillate dry cleaners solvent covered with a poultice. The poultice is prepared by mixing fullers earth with iron-free water to make a stiff mud, which is applied about 3/4" thick. In approximately 24 hours the grease should have been absorbed into the poultice, which then is vacuumed off the masonry. Alternative methods include an ammonia water poultices and commercial dry cleaning powders containing perchlorethylene or tetrachlorethylene. Hydrogen peroxide can be used under the poultice.

These chemicals are generally safe but as with all treatments, tests should be conducted first. Fireplace mantels and jambs should be routinely dusted with a vacuum cleaner or a treated dust cloth for wood, tile, most stone and brick. Only a vacuum or an untreated dust cloth should be used on marble.

Columns, walls, wainscot, marble window sills, etc., should be routinely dusted and checked for staining.

Periodic cleaning should be conducted by wiping with a soft cloth dampened in soft water followed by drying with a dry cloth for marble. Wet techniques using methods and materials described for wall washing should be modified by working with very small areas at a time and scrubbing the solution using a soft brush for marble and a scrub brush for other stone and brick. Smoke stains and soot should be wiped off promptly with ammonia water in a sponge, followed by drying with a soft cloth. When marble becomes dull or stained a conservator should be consulted for instructions on how to repolish or remove the stain.

MAINTENANCE OF METAL SURFACES

HISTORIC METHODS:

Nineteenth century housekeeping manuals did not discuss metals individually, but gave instructions on the cleaning of household items. They wrote about fireplace utensils made of iron and brass, cast iron stoves with black and bright work, candlesticks made of tin, pewter, copper and silver. They discussed cast iron and brass hardware, and utensils in pewter, tin, copper or silver.

Fireplace irons usually were cleaned daily with vinegar and ashes or oil and rottenstone. Cleaning with vinegar was discouraged by some authors as causing a quick return of the corrosion. When put away for the summer the irons were coated with mutton suet, and dusted with slaked lime, then wrapped in cloth.²⁸ Fireplace brasses required daily treatment also and were cleaned with an oily rag and rubbed with rottenstone. Polished steel was cleaned with emery powder and scouring paper.²⁹ Cast iron stoves usually were treated with a mixture of black lead moistened with gin or the dregs of wine, and rubbed and polished with a linen rag;³⁰ at other times the black lead was mixed with egg whites, or with beer and soap, or with alum water. The bright work on cast iron stoves was oiled with sperm whale oil or a mixture of soft soap and emery or putty powder and shined with soft leather.³¹ Rim locks were cleaned after applying a cardboard template to keep the cleaning materials off the door. The cleaning materials for cast iron rim locks were an oily rag with rottenstone or hartshorn powder, polished with leather. Brass knobs on cast iron rim lock bodies were protected with a split paper template which fitted over the knob prior to applying the brass polish materials.³² The front door, in the third quarter of the nineteenth century, had brass work polished daily by blowing on the brass with the breath prior to polishing with whiting. Silver was cleaned with whiting moistened with alcohol.³³ After drying it was polished with dry leather.³⁴

METAL SURFACES

MODERN METHODS:

Cast iron items can be cleaned and protected with stove polish containing graphite. Corroded areas should be cleaned with "000" steel wool and polished with 600 grit emery paper. Items not in constant use can be protected with microcrystalline wax or hard paste wax. Other types of metals generally can be polished with an appropriate commercial polish. On flat surfaces, the polish should be rubbed with a flat sugar pine stick and wiped with a clean cloth until the whole piece is uniformly bright. To polish curved surfaces, several strands of soft cotton wrapping twine are tied together and drawn back and forth in shoe shine fashion; the surface then is wiped clean.

Cardboard templates should be made for rim locks, hinges, door knobs, etc., to protect adjacent surfaces from the polish.

Stove cleaning is as dirty and messy a job today as it was 150 years ago. If the stove is used every day, cleaning once a year is sufficient. Stove pipes must be removed and cleaned along with the stove. As much of the work as possible should be done outdoors in an area not damaged by soot. When disassembling the stove and pipes, drop cloths should be placed over furnishings in the room because soot scatters as part of the disassembly process. Pieces of the stove should be covered as they are removed from the building; the ends of stove pipes, in particular, should be closed. The exterior of stoves and pipes should be blackened with commercial stove polish after reassembly. Andirons, grates, firebacks, and fenders require similar treatment.

Polishing cuts away a portion of the metal with each treatment, with softer metals like silver being damaged most quickly. It frequently is advisable, therefore, to apply a protective coating to the metal to reduce the rate of tarnishing and the necessity of polishing. Lacquer coatings, microcrystalline waxes, paste waxes, etc., may be appropriate but first should be approved for use by a conservator or restoration architect. From time to time the surface coatings must be removed and the surfaces repolished.

MAINTENANCE OF WINDOWS

HISTORIC METHODS:

Feather dusters and whisk brooms were used for dusting. Washing was done with clear soapless water with ammonia. Water only was often recommended. The solution was applied with a sponge, damp cloth or wet newspaper and polishing was accomplished with linen cloths, buckskin and whiting, or dry newspapers.

MODERN METHODS

Dry Methods: As part of the routine dusting, the sash, trim and sill should be vacuumed and the glass wiped with a clean, untreated cloth. A pointed wooden stick like a meat skewer can be used to clean the inside corners formed by the muntin, the glass and the sash frame. For outside dusting a brush or whisk broom is adequate.

Window Washing: Equipment required includes ladders, dusting equipment, pail, sponge, squeegee or chamois, and washing solution. The solution may be nonsudsing household ammonia in water or a mixture of ethylene glycol monoethyl ether and non-ionic detergent, 1/10 ounce of each in one gallon of water.

All items which can become soiled or damaged should be removed from the work area. Floors and window sills should be protected from scuffs and water damage. Beginning with the top sash, the solution is applied with a squeezed out sponge, working from top to bottom. Dirty water should be removed with a sponge, and the window dried with a squeegee. Surfaces adjacent to the glass should be rinsed to remove cleaning chemicals and then dried.

It may be necessary to use a chamois to dry windows with many small panes of glass. In many cases, however, a metal framed squeegee can be cut down to a length about 2/3 the width of the glass; it is essential

that the cut edges are filed and polished before using the squeegee. It may be necessary to put a rivet at each end to hold the blade in place.

Exterior preparations are concerned primarily with safe access for the worker. Washing a double hung window seated on the window sill is probably easier than working from a 40 foot extension ladder provided safety conditions are met. To use the seated window sill method both sash must operate freely and be strong enough that they are not pulled out of the frame in the process. When using a sill for a working platform, it must be protected from abrasion in a manner which is safe for the workman. In some properties the installation of window washer eye bolts may be required. A ladder must be erected at the proper angle and have firm ground supports. Ends of ladders should be wrapped with cloth to prevent marking and denting wood sills, etc. In some properties windows may be inaccessible for many reasons; as a consequence windows in these situations will be neglected. At least every five years some attempt should be made to reach these windows from the outside for caulking, reputtying, and repainting. Some means such as cherry pickers, swing or ground supported scaffolding must be used. If a cherry picker is readily available it also would be useful for most outside washing.

Do not wash windows on the outside when the temperature is below freezing.

BROKEN GLASS:

The broken glass must be removed from the sash and the old putty chipped off with a chisel or jackknife. Glazier's points should be pulled. The wood where the new glass is to rest should be scraped well and given a coat of linseed oil to prevent the wood from absorbing the oil in the putty. In preparing to cut the replacement glass, all four sides and both diagonals should be measured since some sash are not true. The glass should be cut $1/16$ to $1/8$ " smaller than the opening to allow for expansion and irregularities. About $1/16$ " of putty should be spread on the rabbet of the sash, then the glass pressed gently into place. Glazier's points are installed by laying 3 or 4 on each side of the

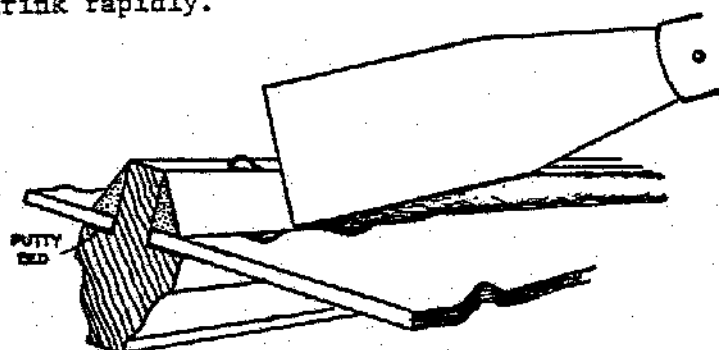
WINDOWS

glass and forcing them into the sash, long side first, with the side edge of a screw driver.

Putty should be recommended by the restoration architect. To prepare the putty for use, it should be kneaded on a nonabsorptive surface such as a glass plate until the mass is pliable. Putty that remains in the can after use may be kept for some time by pouring a thick film of linseed oil over the putty to keep it pliable and placing waxed paper or foil immediately on top of the oil as a seal. Upon removing the waxed paper or foil and kneading, the putty will again be ready for use.

For application to the sash, a small piece of putty should be rolled out between the palms of the hands to form a pencil-shaped roll. The rolls should then be laid end to end on the glass where it abuts the sash, one side at a time. The putty should be pressed down firmly but gently with a putty knife drawing it along the sash from one end to the other. Excess putty should be cut off and used to fill any depressions that have occurred. Care should be taken not to spread the putty far enough over the surface to show on the inside of the window. The same procedure should be followed for the other sides of the sash.

Putty stains may be removed from the glass with a cloth moistened with mineral spirits. After a day or two, when the putty has hardened, it should be painted to match the window sash. The paint should lap slightly onto the glass to seal edge of the putty so it will not shrink rapidly.



SHOWING HOW PROPER BEVEL IS OBTAINED.



GLAZIER'S POINT



ROLL OF PUTTY.

Figure 1: Glazing

Source: Phelan, Vincent B., *Care and Repair of the House*, U.S. Department of Commerce, 1931, page 37.

ITEMS SUBJECT TO WEAR

Some parts of a building, most notably hardware, become worn through use. Unlike floor surfaces, there is no way to add a wearing surface such as a mat. The only alternatives, therefore, are to avoid using the piece of the building or to accept repair or replacement of the items as a recurring requirement. Repairs generally are more desirable than replacement because they allow retention of the original materials; repairs frequently are less expensive, as well.

DOOR LATCHES AND LOCKS:

Latches: Thumb latches are of a limited variety or style. They consist of the necessary back plates, thumb handle and latch bar. There are only two moving parts. They do wear, however, but usually are not damaged except by accident or malicious vandalism. Unless instructed otherwise, latches should be removed for major cleaning. At that time dirt accumulations can be cleaned, and rivets and pivots checked for wear. If recoating of the latch is necessary, only those parts of the latch subject to wear from handling should be coated in order to prevent paint build-up. If the screw or nail holes are enlarged, they can be repaired using standard methods of plugging.

Locks: The greatest maintenance problem with locks which function with spindles through the latching mechanism is a loose knob on one end of the spindle. The action of pulling the door shut countless times and the turning of the knob wears the set screw hole in the knob to an egg shape. The larger the hole becomes the faster it wears. It is essential to keep this set screw as tight as possible to keep the wear from starting. It may be helpful to reverse the spindle and the knobs from time to time to even out the wear. When the hole gets too big, a more permanent repair must be made. With permission, the knob can be turned 90° on the spindle, a new set screw drilled and countersunk, and the old hole filled. This can be done only three times; then there is no more room for correction. Alternatively, the hole can be filled with a hard substance such as silver solder and the original hole redrilled; when this area wears, it can be filled again. It is wise to maintain a knob stockpile of the type and style used in the building. Rim latches should be

ITEMS SUBJECT TO WEAR

removed for major painting, using the opportunity to open the back and check for accumulation of rust and dirt. If the lock action is stiff, the lock may be disassembled for cleaning, being careful to save all the pieces and to remember how they go back together! The cast iron portions of the lock case may be cleaned with a wire brush and scraped of rust accumulation. Any portion of the cast iron lock which is exposed should not be cleaned to bright metal. Portions of the lock case which have worn bright because of action during the latching process can be protected with microcrystalline wax.

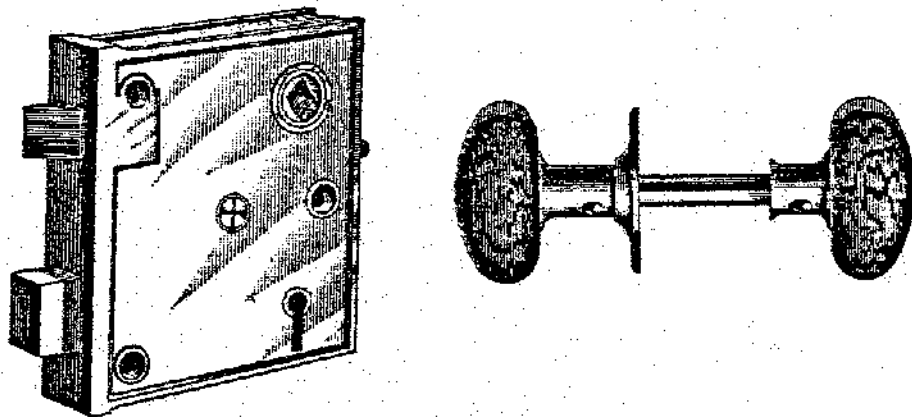


Figure 2: Rim Lock

Illustration from I.C.S. Reference Library, Scranton, 1909.
Pages 48 & 70

HINGES

Hinge problems usually arise from either wear at the knuckles or loosening of the screws. Worn hinges knuckles can be built-up with new material or can have small washers placed between the knuckles to return the door to its original height. Loose screws can be repaired using standard techniques for enlarged holes. If neither of these problems is the cause of an ill-fitting door, the poor fit may be an indication of settlement in the structure. Rather than adjusting the door and hinges to fit the frame, the situation should be examined by a preservation consultant.

ITEMS SUBJECT
TO WEAR

WINDOWS:

In double hung windows, sash cord deteriorates fairly slowly but may have to be adjusted. If the lower sash does not approach the meeting rail or it is difficult to lock the sash (assuming that the sill is clear of obstruction), then the sash cord may be too short. Sash cord adjustment is made by removing the stop bead after raising the sash so that the weight is in its lowest position. Then the sash is taken out of the frame for access to the end of the cord, the sash cord knot is adjusted so the cord is either longer or shorter, and the sash wedge or nail is replaced.

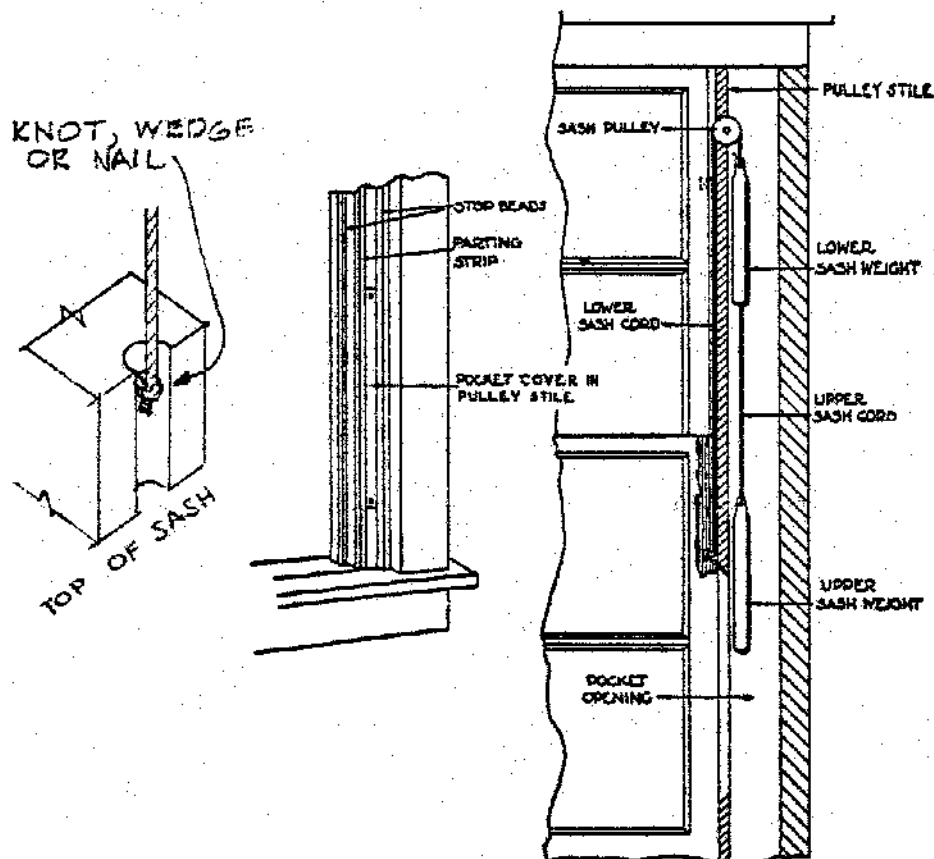


Figure 3: Double Hung Window

From: U.S. Department of Commerce, *Care and Repair of Houses*, Washington, 1931, Page 41.

ITEMS SUBJECT TO WEAR

The same procedure is followed in replacing the sash cord, though it may take a few tries to get the cord to stretch to the proper length. In replacing the sash cord, the appropriate type of cord should be used rather than nylon, chain, or other modern material. If the weight appears to stick in the channel the problem may be either that the pulley is partially frozen or the weight box needs to be cleaned of debris. Double hung windows usually have a weight box cover which is exposed when the lower sash is completely open. The cover is held by a screw, generally at the top. Sometimes the fit is so good that it is hard to see. The weight box should be cleaned whenever it is open and the weight brushed to remove rust accumulation. There will be found various other devices for holding open double hung windows: spring plungers, removable pins, etc. Any movable device should be cleaned of rust and lubricated when the action becomes stiff. It is not advisable to clean metal, especially steel, to the bare metal. Some coating method can be used to reduce the rusting.

After a major painting operation, sash should be daily opened and closed for the first few days to break the paint film and preventing the windows from becoming "painted in" and inoperative. Most modern day paints are formulated to have self leveling characteristics. This means that while flowing the paint will cover cracks and minor imperfections and, incidentally, seal windows as if they were nailed shut.

WINDOW SHADES AND VENETIAN BLINDS:

These items need regular cleaning; they also require regular inspection because exposure to strong light weakens the cloth shades and the tapes on venetian blinds.

Shades: The sizing used on many window shades makes it inadvisable to wash them. They should be dusted often to remove loose dirt and damp wiped before more persistent soil is evident. Shades should be taken down and layed on a flat surface. They then can be wiped with a sponge or wiping cloth dipped in clear water and squeezed.

ITEMS SUBJECT
TO WEAR

nearly dry. The shades should be dried with a clean cloth being sure that both sides are dry before rewinding. If this method fails to clean satisfactorily, a textile conservator should be asked to test the sizing and colors and recommend a safe cleaning method.

Venetian Blinds: Blinds should be dusted by lowering them full length and turning the slats to a closed position. The entire surface is dusted with a treated dust mop or vacuum cleaner, the slats are to the other side and the process repeated. The slats then are opened and dust is brushed out of the tapes. Period venetian blinds and reproductions usually have wooden slats and fancy tapes. As the old tapes have weakened and replacements are likely to be more delicate and expensive than conventional ones, the blinds should be dusted very carefully. This should be done regularly to prevent dirt accumulation. No other cleaning should be permitted without guidance. Woodslatted blinds should never be washed but only damp wiped in place. If the paint is intact the blinds may be damp wiped with water containing a minimum amount of non-ionic neutral detergent. Working from the top down, each slat should be wiped, rinsed, and dried before proceeding to the next slat. If some of the slats have wood exposed, omit the wiping with detergent solution and damp wipe with clear water only. Old tapes should be examined by a textile conservator for determination of recommend cleaning methods. If the tapes are reproduced and are colorfast, they can be dampened with the same detergent solution, rinsed in the same manner with clear water and dried with a fresh cloth. If the dirt does not respond, the whole process can be repeated after first applying a dry cleaning fluid.

CABINET WORK:

Drawers of built-in cabinet work should be inspected on a bi-annual basis for wear on wooden guides. Guides should be lubricated with wax. Drawers and doors which do not fit may be a clue of building movement which should be pointed out to the architect.

MAINTENANCE OF MODERN MATERIALS

SUBSTITUTIONS:

In some projects, original materials have been replaced with substitute materials in an effort to make the building element more durable or to correct a problem inherent to the original design. Interior moldings, for example, may have been replaced with styrofoam or pressed fiberboard rather than plaster or wood; cast iron spandrels may have been duplicated in plastics; and exterior moldings may have been replaced in fiberglass. There are a wide variety of other materials which may have been used. These substitute materials should be identified and carefully watched by maintenance personnel. Most of them have not been in use for a sufficient time to permit a full evaluation of potential maintenance problems, so any signs of deterioration should be reported to the preservation consultant. If project reports do not give specific instructions concerning the maintenance of replacement materials, the project consultant should be asked to provide information concerning solubility, thermal characteristics, and other physical properties so that maintenance personnel can use proper cleaning, painting or repair techniques.

COATED SURFACES:

There is an unfortunate tendency for people to prefer to paint, rather than wash, coated surfaces. This probably is due to the speed with which painting can be accomplished rather than due to lack of success in washing; proper painting, however, takes more time than washing because of the surface preparation required. Unnecessary painting slowly obliterates the rich detail of historic moldings; in addition, thick paint films become inflexible and subject to cracking and peeling. Exterior paints, therefore, should be allowed to wear away before recoating; interior paints should be washed as described earlier.

MODERN MATERIALS

TOUCH UP PAINT:

Paint film wears unevenly depending on exposure and location. Exterior locations which are susceptible to faster than usual deterioration are horizontal surfaces such as window and door sills. These and similar areas will require repainting more often than the less vulnerable surfaces. All exterior paint should be inspected at least every two years for signs of deterioration such as checking, flaking, and chalking. Deteriorated paint must be removed, if necessary to bare wood, before priming and painting. Only deteriorated areas should be painted. Although there may be a slight difference in color and texture between new and old paint, this contrast will be reduced by weathering.

Interior wear will occur at doors, door jambs, hand rails, and high traffic corridor walls. It generally is best to paint only the worn portion of the surface, rather than the entire element, in order to prevent unnecessary paint buildup. Surface preparation should include dirt removal, removal of deteriorated paint, and final cleaning. Two thin coats of touch-up paint are better than one thick coat. It is important to match brush strokes and paint textures as well as paint colors.

Infill painting takes skill and experience in both paint application and color matching. Since worn spots and chips go through several layers of paint, it is necessary to build the touch-up paint back to the original thickness. Sharp edges should be feathered and cleaned prior to infill painting. The paint should be applied in thin coats as mentioned above. A release varnish can be applied as a base coat to facilitate removal of the patch if it is unacceptable. Careful records must be kept of the touch-up work, both in the maintenance log and as part of the separate color schedule for each part of the building.

Some historic property managers keep wet paint samples in addition to dry samples. Wet samples frequently are more convenient to match than dry, and can provide small amounts of paint for infill painting. Some sites have wet samples over 25 years old. The medium must be replenished periodically to replace any which may have evaporated or oxidized; it is important to keep the container quite full to minimize oxidation. Storing the paint container upside down will help to prevent air seepage, thus helping to prevent oxidation.

MAINTENANCE OF MECHANICAL SYSTEMS

HEATING:

Boilers of a commercial or industrial type should be under the care of trained personnel. In smaller installations, the most important task which can be performed is periodic inspection of heating appliances, which should be checked for clean pilots, main fuel valves and thermostats during the non-heating season by a trained specialist. Burners have a 15-20 year life, thus requiring eventual replacement. During the heating season maintenance personnel should check the safety valve and boiler thermometer on a regular basis. Local personnel also should check the drain cock washer yearly and replace it if necessary. The flue connection from the boiler to the stack should be checked occasionally and painted with heat resistant paint when necessary; the flue balancing valve should operate freely. Radiators should be inspected on their bottoms for water, which may be an indication of leaks or faulty joints.

Hot Air Systems: Specialized maintenance personnel should conduct an annual inspection of these systems. Local personnel should clean filters and grilles monthly, or bi-monthly if dirt accumulations are substantial. The purpose for an air filter is the same as the use of a door mat--the removal of dirt at the entrance source.

ELECTRICAL SYSTEMS:

The yearly inspection of the electrical system should include all runs of exposed electric wire to check for abrasion. Tree branches should be trimmed so that they do not rub exterior wiring. Rubber sheathed cable deteriorates slowly and must be replaced approximately every 25 years. The annual inspection also should include electric panels, toggle switches, convenience outlets, and lamp holders.

MECHANICAL SYSTEMS

SECURITY SYSTEMS:

Annual inspection frequently is included in a maintenance contract. If not, this inspection should be conducted by someone knowledgeable with the system. If the system has a trouble light, it should be tested at least daily; if it includes internal testing features, these also should be activated daily to detect inside tampering.

FUEL LINES:

Lines for gas and oil are difficult to inspect because much of the work may be concealed in the ground or the structure. These lines should be checked for secure attachment, easy operation of the valves, and signs of deterioration.

PLUMBING SYSTEMS:

Historic Plumbing Fixtures: Historic tubs and sinks may be metal or a plated or tin washed metal. These should be cared for as described under metal. China, and porcelain enamel on metal should not be subjected to the action of strong or abrasive cleaners. Most troublesome maintenance involves the operation of the fixture. It should be inspected on an annual or bi-annual basis. Careful notes concerning the disassembly process, the types of washers required, and items subject to wear should be made to facilitate later work. Preparation of a list of parts which may be required for future maintenance and including them in the stockpile will insure that future emergencies do not arise. Toilet tanks should be cleaned during the inspection to remove accumulated rust or foreign matter.

Private Water Supply: Pumps for cisterns and wells should be checked annually. If pumping fails, the leather and the sucker valve may have become worn. In northern climates there should be a dripping noise after the pumping is completed. This indicates that the freeze hole is not plugged and that the pump drains dry to prevent freezing. There are several pins and pivots in each pump which generally are exposed and which should be checked for wear and proper lubrication.

MECHANICAL SYSTEMS

Cisterns should be cleaned every two years. After plugging the inlets or disconnecting the downspouts the cistern should be pumped dry. The layer of muck on the bottom of the cistern, which is primarily inorganic dust and soot, should be cleaned off the bottom of the cistern. The cistern then should be rinsed, scrubbed with a detergent, and washed thoroughly.

CAUTION: Employees should never work in a cistern alone.

Blockages: Sinks usually become blocked by either fat or hair. Drain cleaners primarily are designed to dissolve the greasy elements of the blockage or to create heat to melt it. Due to their reactive nature, drain cleaners are not recommended for historic properties. Instead, all blocked plumbing should be cleared with an auger. Additional information concerning the maintenance of plumbing fixtures is given in other portions of this booklet.

MAINTENANCE OF EXTERIORS

DIRTY EXTERIOR WALLS:

Although rain itself does not have the capacity to carry particles into suspension, it can, by the sheer force of rain, splash dirt onto foundations and walls. Rain also may splash dirt on walls from lower roofs. The force of a hose may drive this material off; if not, detergent and warm water should be adequate to loosen the dirt so that it can be rinsed away with a hose. Strong soap solutions may leave streaks on the wall paint or masonry.

CLOGGED GUTTERS:

Roof gutters have been the cause of a great amount of building deterioration. Some gutter designs cause more problems than others. Built-in gutters have particular problems because when clogged with leaves and other debris they serve as a tank which can overflow into the building interior. Gutters mounted rigidly on the building cornice when clogged can saturate surrounding support members. Wood gutters fastened below the roof overhang on brackets are probably the least troublesome. The amount of solid debris that a gutter will receive depends upon the surrounding tree cover. A building in the mature forest in the northern part of the country will get an enormous amount of leaf accumulation. Leaves are not the only debris which collect in gutters. Airborne dust washed from roofs, broken limbs, childrens' toys and balls, and a surprising variety of other strange materials collect in gutter systems. Debris is not damaging until it impedes the water flow. It is reasonable to predict that at certain times of the year debris accumulation will be greater than others and especially in the autumn when tree leaves are shed in the more temperate areas. Gutters should be visually checked and cleaned if necessary at least once a month from September to March and weekly from the first killing frost until all the leaves have fallen.

During periods of freezing and thawing water can be forced into a tight roof as a result of ice and snow dams. Ice and snow dams occur most frequently in uninsulated attics of heated buildings or in insulated buildings which do not have provisions for outside air movements above the insulated top floor building panel.

EXTERIORS

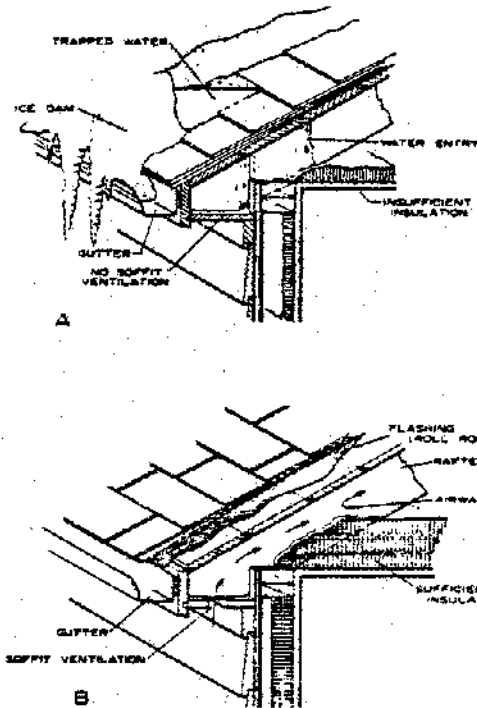


Figure 4: Ice Dams

A, Insufficient insulation and ventilation can cause ice dams and water damage; B, good ventilation, insulation, and roof flashing minimize problems.

Source: U.S. Forest Products Laboratory, *Condensation Problems: Their Prevention and Solution*, Madison, Wisconsin, 1972, Page 32.

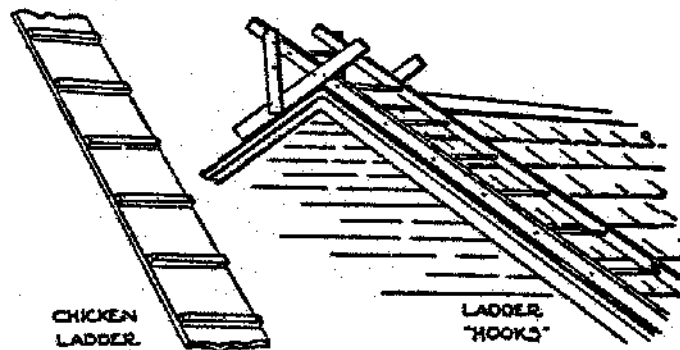


Figure 5: Supports for Roof Repairs

Source: U.S. Department of Commerce, *Care and Repair Of the House*, Washington, 1950, page 44.

SURFACE MUD, SNOW AND ICE

As was mentioned earlier, severity of human erosion in buildings is dependent upon the nature of exterior conditions. Loose materials can be tracked into the building causing abrasive wear, especially to floors. At some point in a projects' planning, decisions are made concerning site interpretation. Historic accuracy of site interpretation may, by its nature, cause considerable maintenance and cleaning problems. Mud, snow and ice in addition to causing maintenance difficulties are also hazards. It is the responsibility of the maintenance staff to make the area free of as many hazards as possible.

Mud: Mud is often caused by inadequate drainage of a building site. A small isolated mud puddle caused by the compaction of vehicular traffic or earth settlement in a walkway can be corrected by raising the surface of the ground in this area. This will probably have to be done several times before it is stable. If the site develops a whole series of puddles or becomes a miniature lake during periods of heavy water run off, it should be brought to the attention of the restoration architect and landscape architect because large volumes of undrained water near a building can be very damaging to the building fabric and cause the building user inconvenience.

Snow: Heavy accumulations of snow should be removed promptly. Snow under the pressure of foot traffic melts, burning to ice. Fresh snow generally can be swept or brushed away. When areas are extensive, mechanical systems are often used as they are much more efficient than hand methods. Monolithic paving surfaces such as concrete and asphalt respond reasonably well to snow blades; however a loose surface such as gravel may be swept into the flower beds and lawns only to be discovered with disgust in the springtime. Blades also can scar a rigid material. Historic materials such as cobblestone, brick, and stone paving can be irreparably damaged as corners and edges are chipped away by rigid snow blades, so these should never be used. Fixed or revolving brushes can do a superior job by getting into crevices and sweeping right down to the wearing surface and do very little damage to the road or walk material provided that the hardness of the brush material does not exceed that of the paving material itself. Snow throwers are even more dangerous than rotary lawn mowers and have

MUD, SNOW
AND ICE

more moving parts. Snow blowers can cause the same type chipping of historic materials as blades. Ice melting chemicals are convenient to use and are very efficient. They can cause tracked in salt solutions, however, and the increased labor inside the structure may be more than the labor saved outside. Salts also are corrosive to many finishes and can cause spalling of brick and stone; in addition, they are harmful to many plants, especially perennial plants and shrubs.

PLANT GROWTH

Plant growth can effect historic properties both physically and visually. Although more detailed information concerning landscapes and plant growth will be included in a later volume in this series, a few comments at this point can help to point out potential dangers of uncontrolled plant growth.

Plant Material growing on a building, such as moss, lichens, and vines, can have a harmful effect on the building materials. These plants tend to keep the building damp, which promotes conditions of deterioration. The presence of moss and lichens indicates an inherently damp condition, and the building should be inspected for leaking gutters, damaged roofing, and rising capillary moisture. Plants, particularly ivy, can extend tendrils below wall surfaces, causing pressures which can crumble masonry and mortar. Plant material, therefore, should not be permitted to grow on historic structures.

Roots: Tree, vine and shrubbery roots are constantly in search of moisture and nutrients; depending upon the species, the roots can travel great distances. In some clay soils roots extract water from the soil resulting in soil shrinkage. If this soil supports a building foundation, voids will be produced causing foundation settlement, reflected by cracks in the walls above.³⁸ Trees and plants often seed themselves close to building walls and this volunteer plant material should not be allowed to grow because of the eventual damage done to the structure.

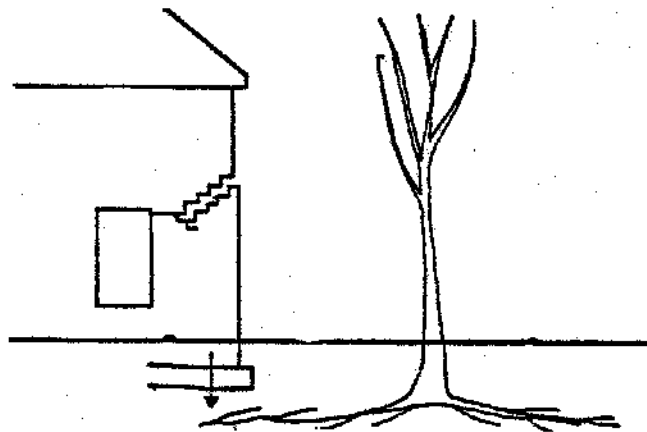


Figure 6: Drying out of Shrinkable Clay by Tree Roots
Adapted from: Bowyer, Jack, *Guide to Building Surveys*,
London, second edition, page 74.

PLANT
GROWTH

Inspections should be conducted at the beginning of the growing season and monthly during the growing season for signs of change in drainage patterns and evidence of plant material damaging the building.

OUTBUILDINGS

In general outbuildings require the same kind of maintenance as the main building itself, except that outbuildings seldom include mechanical systems. They often have shallow foundations which make it necessary to maintain the drainage slopes away from the buildings to minimize the probability of damage from heaving caused by saturated soil. Outbuildings often are used for storage and should be checked periodically for moisture which may be harmful to the stored contents. Preferably an outbuilding should be used for the storage of flammable paint materials and cleaning materials that may be used on the property.

BIOLOGICAL ATTACK

SIGNS OF BIOLOGICAL ATTACK:

Early Signs: Biological attack of building materials almost always occurs in the presence of excessive moisture. Moss, algae and lichens on wood are a sure sign that moisture is present in the amount necessary for wood to be damaged. Moss is the well known greenish material; lichens are similar to moss but can be in various colors. Thin green tints on cement or stones frequently are algae; black or colored stains on painted surfaces frequently are mildew. While these can be removed without too much trouble they indicate a serious moisture condition in the wood itself. These conditions should be noted and the proper people notified for corrective action.

Interior Signs: In the interior and dark place of attics and basements where moisture is liable to occur there may be fruiting bodies somewhat like mushrooms growing out of the wood. These are indications of active biological deterioration. In the main body of the house itself, cracks in vertical corners of rooms or cracks at the intersection between walls and ceilings are an indication that the building is settling, which may be due to the collapse of rotted sills. Doors that do not fit properly and are racked in their openings also can be an indication of foundation deterioration. Out of line door swings should not be corrected by altering the door until it is positively determined that biological attack is not part of the problem.

INSECT CONTROL:

If there are no screens on the building insects coming through open windows and doors in the summer time may cause cleaning problems due to fly specks. Fly specks were an enormous problem to the historic housekeeper. Fly marks are especially damaging to gilt picture frames. During the fly season, historic housekeepers often would completely cover pictures and mirrors with muslin to overcome the fly mark problem. Mosquitoes can develop from above ground cisterns and rain barrels and can be controlled in open water with a very light oil. Insecticides sprayed in the air are generally

BIOLOGICAL ATTACK

not allowed because of the chemical residues and possible corrosive effect on delicate materials. Fly paper can be used effectively in most areas.

Termites, beetles, and carpenter ants cause less visible, but more serious problems than more visible insects. Termites are wood eating insects which attack primarily soft sapwood. They are most active in locations with high moisture and usually enter the wood at or below ground level. Beetles also eat wood, even in dry areas above ground. Carpenter ants burrow into wood to make a home, not to find food; they seldom are a serious problem. All wood portions of a building should be inspected for insect damage at least once each year. Clay tubes on pieces of wood, small holes in the wood, and small unexplained piles of sawdust are all signs of insect activity. If any of these signs appear between inspections, an insect control specialist should be called in to make a thorough investigation.

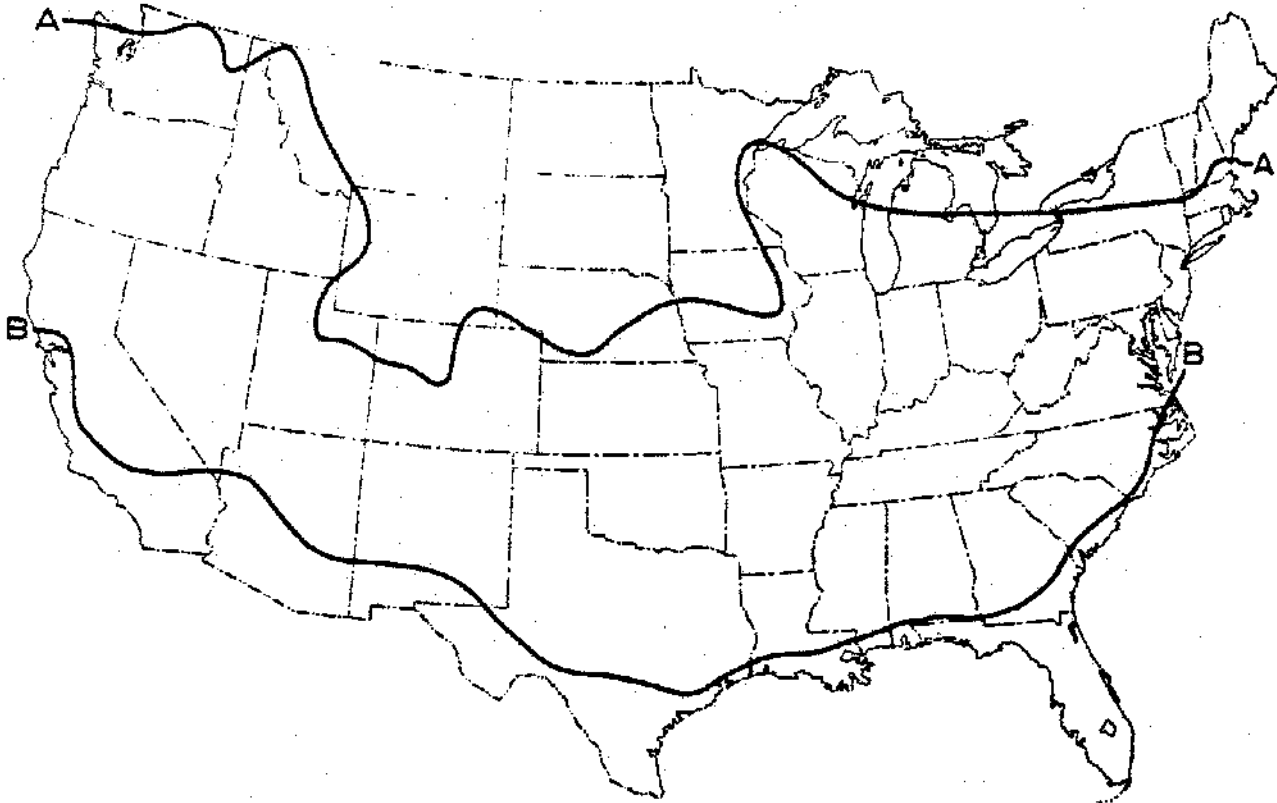


Figure 7: Termite Map

The northern limit of damage in the United States by subterranean termites, line A; by dry-wood or nonsubterranean termites, line B.

Source: U.S. Department of Agriculture, *Wood-Frame House Construction*, Agriculture Handbook No. 73, Washington, D.C., 1970, p. 196.

INCOMPATIBILITY OF MATERIALS

Some building materials are corrosive to other building materials. Oak gives off acetic acid which in both solution and vapor, can rust steel severely and also is corrosive to lead and copper. Western red cedar and some Douglas fir also are corrosive to unprotected iron. Many wet woods are acidic and will attack steel and zinc. Fire retardant chemicals on wood are used in such great concentration that they are more corrosive to iron.³⁹

Under moist conditions galvanic action can occur between different metals in contact, causing corrosion to one of the metals. The degree to which the corrosion occurs depends on the kinds of metal involved, how well the metals are in contact, and the conductivity of the moisture. Most common metals do not show corrosion effects when the relative humidity of the air is below 60%. Where dissimilar metals happen to occur in small amounts, an isolation coating of bituminous paint will give adequate protection.⁴⁰ Copper will corrode iron and zinc.⁴¹ Copper itself is a fairly impervious material. There are a few things which effect it, however, including water which is acid in character, such as that which comes from peaty areas, and sulfur dioxide in the air, which forms sulfuric acid. Ammonia will also corrode copper, so it should never be used in cleaning except as a part of an approved commercial cleaner. While Portland cement does not attack ferrous metals it can be corrosive to lead and zinc, as can lime.⁴² Lead, copper and zinc can be corroded by the acid charged water dripping from roofs. The acid from living substances, such as algae, moss, or lichens growing on a roof, is corrosive to lead, copper and zinc; the drip line of a metal roof can be completely eaten away from this type of rain run-off.⁴³

Building materials also can be attacked by cleaning chemicals. Wood is resistant to acids but is affected by strong alkalis, therefore many alkaline household chemicals such as lye and ammonia can attack wood. Acids can directly attack some masonry materials; in other cases, though the masonry may not be dissolved when in the contact with acids, the masonry can be destroyed because the acid solution below the surface of the masonry can evaporate, leaving salt crystals which form enormous internal pressures. All acids can disintegrate marble and limestone, so acid cleaning of these materials is out of the question. Iron compounds are staining to marble and cleaning compounds for marble shouldn't even be put in iron containers.⁴⁴

CONDENSATION

Condensation in building terms is the process by which water vapor, a gas, changes to a liquid. There is always water vapor in the air, the amount depending upon the local climatic conditions. Within a building, the amount of water vapor depends upon the amount of vapor generated by the users. Air has the ability to hold water vapor in accordance with the temperature of the air. The higher the air temperature the more water vapor the air can hold; the lower the temperature, the less water vapor the air can hold. When the air is saturated it has reached the dew point. If the temperature drops, the air can no longer hold all the water, so the excess is changed back into liquid form. Dew on lawns and cars in the morning is formed because the air temperature went below the dew point the night before.

Surface condensation occurs on any building material whose temperature is lower than the dew point. This can often be seen on window glass in the winter and exposed cold water pipes in basements in the summer. Condensation is visible on surfaces which are nonabsorbent. When condensation takes place on bare wood or other porous material, the water is absorbed so that it is not visible on the surface. Condensation can occur within walls and ceiling spaces; this is known as interstitial condensation. Condensation can be injurious to building materials, especially wood, because the moisture level can be raised to the point that biological attack occurs; it also destroys insulation.

INSPECTION FOR CONDENSATION:

Old buildings often are susceptible to moisture in spaces below ground level: basements, cellars, crawl spaces, root cellars, well pits, etc. A basement with condensation on water pipes shows a relative humidity of 100%. Where water pipes do not occur another telltale indicator is a peculiar musty or damp smell. The right way to find out the moisture content of the air is with a Humidity Gauge (accurate ones are not easy to find) or a Sling Hygrometer. When wood has a moisture content of over 20% it is subject to biological attack.

CONDENSATION

Cutting down of basement humidity can be accomplished either by ventilation or dehumidification. Ventilation requires that air be exhausted from the space and that drier outside air be brought into the space at the same time from a basement window or from upper floors. To be effective, air must be exhausted with a fan. When using a dehumidifier all openings should be closed while the dehumidifier is in operation. The effectiveness of each system should be checked by a humidity indicating device. Water collected from a dehumidifier is distilled water, a most valuable material for household cleaning, and should be saved.

HUMIDITY PROBLEMS:

Condensation on glass can be an annoyance and may cause trouble if the paint film on the sash and trim permits moisture penetration. If maintenance procedures are inadequate dirt can be washed down upon fabrics and wallpaper causing stains. Sometimes window condensation problems can be helped by applying a mixture of equal parts of glycerin and methylated spirits to the inside of the glass with a cloth. If shellac is used in the finish of the windows, this mixture cannot be used because alcohol will destroy the wood finish.⁴⁵ This treatment must be applied anew each time the windows are washed. Winter condensation can occur in attic and roof spaces as moist air in the attic condenses on the cold roof surfaces. This sometimes can be detected by oval or brown spots on the ceilings of the upper story. By the time the spots are noticed the damage could be quite severe. An annual inspection of unheated attic spaces should be made during the coldest part of the year. An unsatisfactory condition should be reported to the restoration architect for restorative measures.

DIMENSIONAL CHANGE

All materials are subject to expansion and contraction due to change in temperature and humidity. Dimensional change due to humidity generally is confined to timber and wood. Below fiber saturation at 25% moisture content, wood cells shrink. As wood cells generally run parallel to the grain of the wood, more shrinkage occurs in cross section than in length. During this process, wood may be distorted or warped; flat sawn wood warps more than quarter sawn wood.

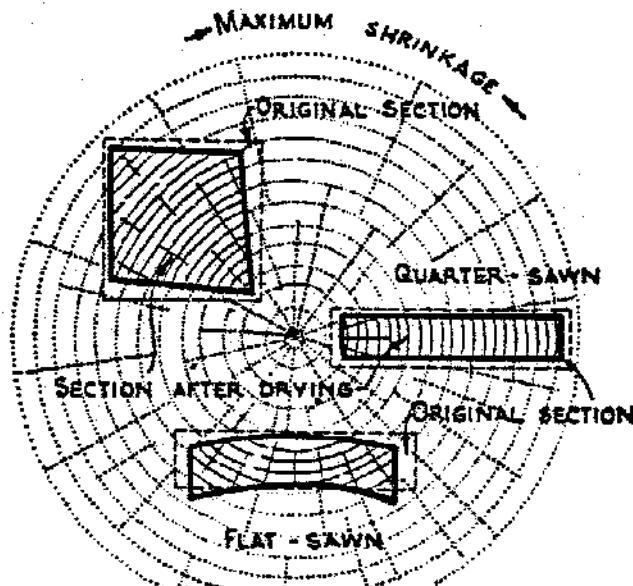


Figure 10: Wood Shrinkage

Source: Ministry of Public Buildings and Works, *Principles of Modern Building*, 3rd Edition, London, 1959, Page 123.

DIMENSIONAL CHANGE

Other than for aesthetic and protective reasons, a major purpose of paint on wood is to reduce the rapid swelling or shrinkage. In climatic conditions where the heating season is short, wood in heated spaces changes moisture content very little. The longer the heating season the greater the possibility of wood distortion by warping. Buildings with new heating systems are in particular danger of interior wood distortion during the heating season. The opening of the inside corner of miters will be the first sign of wood shrinkage.⁴⁶ The wider the board, the greater the shrinkage.

If an all year round comfort heating and cooling system has been installed in an historic structure, humidity will be lowered in the summer time and may or may not be raised in the winter time. If all year round humidity control is provided, moisture content equilibrium is beneficial to the interior wood. Wood movement which does occur during low humidity levels in the winter time.

Maintenance personnel should watch for changes in the humidity level throughout the heating season. An area which can be checked regularly, such as an inside door frame, should be inspected weekly. If miters begin to open at the back, expert assistance should be requested as an interim measure, the heat should be lowered and the humidity raised as much as possible.

VANDALISM

Vandalism results in either defacement or destruction of a part of the historic property. Vandalism which remains uncorrected is an advertisement and encouragement for additional damage. Rapid repairs, therefore, should be made whenever possible.

Defacement most often takes the form of graffiti. The writing sources are somewhat faddish, with spray paint, felt tipped markers and lipstick most popular at this time. The difficulty in graffiti removal depends upon the type of writing material and the type of surface which is defaced. If possible, maintenance personnel should anticipate which surfaces will be defaced and the types of markers which will be used, so that tests for effective cleaning techniques can be conducted in advance. The tests should include the least damaging cleaners, such as distilled water and water with neutral detergent, as well as a variety of stronger solvents. The results will serve as a guide to rapid removal and may indicate the desirability of stocking cleaning materials not normally used for other purposes. The cleaners should be tested for both effectiveness and for safety to the building materials. Damage to fragile items such as papers and fabrics should be left to a conservator.

Attempts frequently are made to make surfaces more resistant to graffiti, usually by applying a coating to which the graffiti does not readily adhere. Although these coatings may reduce graffiti, at times the coating can cause serious detrimental effects, especially to masonry. It generally is best, therefore, to limit the application of any type of coating to areas with specific problems. Even then, coatings should be applied only after thorough testing over an extended period to determine possible detrimental effects.

APPENDIX A: WORK FREQUENCIES

This appendix provides suggested frequencies for performing maintenance activities. It must be modified, of course, to fit the requirements of each property. Similar charts should be incorporated in the maintenance guide.

The letters "A" through "J" indicate the relative frequency of the treatment. There is a certain amount of local adjustment which is required because of the local circumstances of producing soil. The lower in the alphabet generally the less frequent the treatment. A "B" frequency would be repeated many more times than a "D" treatment.

Each box on the chart contains a letter and a number. The letter indicates the type and frequency of maintenance treatment. The number indicates the page in this handbook on which the appropriate treatment is discussed; locally developed charts should indicate the page in the local maintenance guide which discusses the specific treatment required. Boxes which contain a dash rather than a number indicate treatments which are beyond the scope of this text, either because they require treatment by a conservator or because they are standard contemporary maintenance techniques.

"A" Policing as Required: Policing is a high frequency task which is performed during and immediately after the use of the building by large numbers of people, removing conspicuous soil and trash so that it will not have a chance to become permanently embedded in the finish surfaces. The amount of policing will depend upon weather conditions and the building use. Each historic property will have different priorities and different problems.

"B" Routine Housekeeping and Maintenance: This is a dry type maintenance, covering all reachable surfaces so that accumulations do not become permanently embedded due to their oily content. The frequency could be daily, twice a week, or weekly. It may vary for different locations in the building and with the season because of peak visitor periods, or it may vary because of seasonal weather conditions or seasonal air quality.

"C" Periodic Maintenance may be a dry, damp or in some instances a wet treatment which cleanses surfaces removing those accumulations not generally removed by the more frequent methods. If wet, it removes portions of the finish itself which has become chemically changed due to exposure, thereby renewing to a certain extent the surface. The frequency ranges from weekly to monthly.

"D" Periodic Maintenance: The frequency is monthly, bimonthly or quarterly.

"E" Periodic Maintenance: The frequency is quarterly or semi-annually.

"F" Periodic Maintenance: The frequency is semi-annual or annual. Perhaps by a contractor.

"G" Periodic Maintenance: The frequency is annual or biennial. Perhaps by a contractor.

"H" Maintenance: The treatment is prescribed by a conservator. It may be both routine and periodic at a frequency which would best protect the item. The conservator should suggest means of protection as well as treatment.

"I" Maintenance: The treatment should be done by a conservator or an outside specialist.

"J" Maintenance: Irregular frequency; use past experience as a guide; consider outside contractor.

ITEM	Policing	Routine	Periodic #1	Periodic #2	Periodic #3
1. Mats at entrance, exterior	A/53	B/-	C/-		
2. Mats at entrance, interior	A/53	B/-	C/-		
3. Sand urns at entrance	A/-	B/-	C/-		
4. Water coolers, spills	A/-	B/-	C/-		
5. Canteen dispensers, spills	A/-	B/-	C/-		
6. Rest Room containers	A/-	B/-	C/-		
7. Rest Room Spills	A/-	B/-	C/-		
8.					
9.					
10.					
11.					
12.					
13.					

ITEM	Policing	Routine	Periodic #1	Periodic #2	Periodic #3
14. Floors near Ent. hard surf.	A/ -	B/	D/		
15. Floors near Ent. covered	A/ -	B/		F/	
16. Stairs near Ent. hard surf.	A/ -	B/	D/	F/	
17. Stairs near Ent. covered	A/ -	B/			
18. Traffic runners hard surf.	A/ -	B/	D/		
19. Traffic runners plastic	A/ -	B/	C/		
20. Traffic runners carpet	A/ -	B/		F/	
21. Trash receptacles	A/ -	B/-	C/-		
22.					
23. Floor hard surfaces coated	A/	B/	D/	F/	
24. Floor uncoated wood	A/ -	B/53	C/54	D/	F/
25. Floor Marble		B/53	C/54	D/55	
26. Floor Terrazzo		B/53	C/54	D/55	
27. Floor resilient		B/53	C/54	F/55	
28. Floor brick		B/53	C/54	F/55	
29. Floor bare earth			C/-		
30.* Floor oilcloth, historic		H/ -	I/ -		
31.* Floor Carpet, historic		H/ -	I/ -		
32.* Floor carpet, reproduction		H/ -	I/ -		
33. Floor carpet, contemporary	A/ -	B/57		F/57	
34. Floor grilles		B/ -	D/ -		
35. Radiators		C/ -			
36. Stairs	A/ -	B/	C/	D/	
37. Furnace filters			D/12		
38.					
39. Window sills coated wood		B/47		D/48	G/48
40. Window sills marble		B/59		D/58	G/58
41. Window sills bare wood		B/51		D/51	G/51
42.					
43. Door and Window trim, top		B/47		D/48	G/48
44. Horiz. trim tops doors, base		B/47		D/48	G/48
45. Horiz. trim tops paneling		B/47		D/48	G/48
46. Horiz. trim tops wainscot		B/47		D/48	G/48
47. Light fixtures	A/72	B/72	H/ -		
48.					
49.					
50.					
51. Walls at light switches		B/47			
52. Doors at knobs and push plates		B/47			
53. Wall grilles and louvres		B/61	D/61		
54. Walls above air grilles		C/47	F/48		
55.					

* Custodial Staff

ITEM	Policing	Routine	Periodic #1.	Periodic #2	Periodic #3
56. Walls smudged		B/48			
57.					
58.					
59. Walls, coated etc.		D/47		G/48	
60. Walls, coated water soluble		D/47		G/ -	
61. Walls, bare plaster		C/47		G/	
62. Walls, bare wood		D/51	E/51	G/51	
63.					
64.* Walls, wall covering, historic		H/-	I/ -		
65.* Walls, wall covering, reprod.		H/-			
66. Walls, wall covering, contemp.		D/-		G/-	
67. Walls, fabric covered		H/-			
68. Ceilings coated		F/47	G/48		
69. Ceilings wood		F/51	G/51		
70. Ceilings					
71. Wainscot coated		D/47		G/48	
72. Wainscot					
73. Ceiling Cornice coated		E/47		G/48	
74. Ceiling Cornice					
75. Ceiling Cornice substitute		E/70		G/70	
76. Window trim coated		E/47		G/48	
77. Window trim					
78. Door trim coated		E/47		G/48	
79. Door trim					
80. Floor base coated		E/47		G/48	
81. Floor base					
82. Window glass interior			E/62		
83.					
84.					
85.					
86. Hdw. and elec. plates polished		C/61	D/61	G/61	
87. Hardware painted		C/47	D/48	G/48	
88. Hardware					
89.					
90.					
91.* Fabrics at windows, historic		H/-	I/-		
92.* Fabrics at windows, reprod.		H/-			
93.* Fabrics at windows, contemp.		C/47	G/-		
94.* Adjust blinds for sunlight control during the day	A/-				
95.* Window Shades, historic		H/-			
96.* Window Shades, reproduction		H/-			
97.* Window Shades, contemporary		C/68		G/68	
98.					

* By custodial staff

ITEM	Policing	Routine	Periodic #1	Periodic #2	Periodic #3
99.* Venetian Blinds, historic		H/-			
100* Venetian Blinds, reproduction		H/-			
101* Venetian Blinds, contemporary		C/69		G/69	
102.					
103. Ultra Violet Filters		B/47			
104.					
105. Damp wipe with disinfectant such surfaces extensively handled by visitors as the top rails of room barriers,		B/-			
106.					
107.					
108.					
109.					
110. Rest-room care	A/-	B/-	C/-	G/-	
111. Vitreous china	A/-				
112. Toilet seats, seat bottoms	A/-				
113. Bowls, under rims; inside urinals		B/-			
114. Commodes, urinals, dispensers		B/-			
115. Wipe cubicles, walls, and doors		B/-			
116. Sinks and hardware		B/-			
117. Hardware underneath sinks			C/-		
118. Walls by sinks, spattered areas		B/-			
119. Polish mirrors		B/-			
120. Metals			C/-		
121. Hand-dryers		B/-	C/-		
122. Walls, lights					
123. Ladies' lounge	A/-	B/-	C/-	G/-	
124. Fill dispensers to max. levels	A/-				
125.					
126. In front of commodes, urinals	A/-				
127.					
128.					
129.					
130.					
131. Unused spaces floors		G/ 53			
132. Unused spaces walls		G/ 53			
133. Unused spaces ceiling		G/ 53			
134.					
135.					

ITEM	Policing	Routine	Periodic #1	Periodic #2	Periodic #3
136. Janitors closet floors	A/-		B/-	F/-	
137. Janitors closet walls			D/-	F/-	
138. Janitors closet ceilings		F/-			
139. Janitors closet sink		B/-			
140. Equipment		B/-			
141.					
142.					
143.					
144.					
145.					
146. Work space floors	A/-	B/ 53	D/ 54		
147. Work space walls		F/ 53	G/ 54		
148. Work space ceilings		F/ 53	G/ 54		
149.					
150.					
151.*Furnishings Wood		H/-			
152.*Furnishings Fabric		H/-	I/-		
153.*Pictures		I			
154.*Picture frames wood		H/-			
155.*Picture frames gilt		H/-	I/-		
156.*Objects metal		H/-			
157.*Objects Glass		H/-			
158.*Objects China		H/-			
159.*Mirror		H/-			
160.*Picture glass		H/-			
161.					
162.					
163.					
164.					
165.					
166.					
167.					
168.					
169.					
170.					
171.					
172.					
173.					
174.					
175.					
176.					
177.					

* Custodial Staff

EXTERIOR ITEMS	Policing	Routine	Periodic #1	Periodic #2	Periodic #3
178. Porches	A/53	B/ 53	D/ 54		
179. Porch steps	A/53	B/ 53	D/ 54		
180. Porch steps handrails	A/47	B/ 47	D/ 48		
181. Porch column					
182. Porch cornices					
183. Porch ceiling					
184.					
185.					
186.					
187.					
188. Windows - accessible			E/ 62		
189. Windows - nonaccessible			G/ 62		
190. Windows sills			E/ 48		
191. Screens, Screen doors			G/-		
192. Screen hardware			G/-		
193. Shutters			G/-		
194. Shutters hardware			G/-		
195.					
196.					
197.					
198. Roof gutters	A/75		E/ 75		
199. Downspouts	A/75		E/ 75		
200. Roofs materials					
201. Masonry			G/-		
202. Masonry joints			G/-		
203. Walks near entrance	A/ -				
204. Walks concrete	A/ -				
205. Walks brick	A/ -				
206. Walks gravel or bare earth	A/ -				
207.					
208.					
209.					
210. Parking lots hard surface	A/ -				
211. Parking lots gravel	A/ -				
212. Exterior lighting and time					
213. clocks					
214. Drains hard surface					
215. Drains gravel					
216.					
217.					
218.					
219. Shovel steps, walkways, and driveways for snow	A/ 77				

EXTERIOR ITEMS	Policing	Routine	Periodic #1	Periodic #2	Periodic #3
220. Plow parking lots, roads, and driveways for snow	A/-				
221. Sprinkle sand and salt on lots and/or roads for ice	A/-				
222. Remove snow on lots by hauling away.	A/-				
223. Remove snow on road edges by blowing away.	A/-				
224. Grounds					
225.					
226.					
227.					
228. Fences and gates wood		G/-			
229. Fences stone		G/-			
230. Fences and gates metal		G/-			
231.					
232.					
233.					
234. Outbuilding #1			G/ -		
235. Outbuilding #2			G/ -		
236. Outbuilding #3			G/ -		
237. Outbuilding #4			G/ -		
238. Outbuilding #5			G/ -		
239.					
240.					
241.					
242.					
243.					
244. Lawns		C/-			
245. Gardens		B/-			
246. Shrubs		G/-			
247. Trees specimen		G/-			
248. Trees ornamental		G/-			
249. Trees Fruit		G/-			
250. Leaf removal	A/-				
251.					
252.					
253.					
254. Cisterns		G/ 73			
255. Wells		G/ 73			
256. Septic tanks		G/ 73			
257. Dry Wells		G/ 73			
258. Meter pits		G/ 73			

APPENDIX B: WORK TIME UNITS

STANDARD JOB TIME LIST Time in Seconds

<u>DUSTING</u>		<u>MISCELLANEOUS</u>	
Ash Tray	15	Door (Washing)	150
Book Cases		Drinking Fountain	90
13"x35"x12"	22	Vacuuming (Large Divan)	190
36"x30"x8"	33		
42"x24"x11"	49	<u>LAVATORY ITEMS</u>	
Cabinets		Cleaning Commode (With Partition)	180
36"x77"x18"	106	Door (Spot Wash)	50
30"x66"x18"	42	Door Latch	10
Chairs		Mirrors	
Large	63	25"x49"	20
Medium	35	60"x21"	20
Steno	22	88"x31"	40
Clock, Wall	20	Napkin Dispenser	13
Desks		Napkin Disposal	10
Large	48	Paper Towel Dispenser	7
Medium	43	Paper Towel Disposal	10
Small	38	Shelving	
Doors		20" long	8
Without glass	25	126"x6"	60
With glass	40	Urinals - Complete	120
Fire Extinguishers	16	Wainscoting	
Lamps and Lights		75-100 Ft. Long	25
Table Lamp, Shade	35	Wash Basin, Soap Detergent	120
Floor Lamp, Shade	35		
Radiators and Window		<u>WALL, CEILINGS AND GLASS</u>	
Ledge (124"x15")	45	Door, wash both sides	150
Sand Urns	60	Glass part., clear, wash, per	
Tables		sq. ft.	
Large	60	Wall, marble, wash, per sq. ft.	5.5
Medium	35	Wall, tile, wash per sq. ft.	9
Small	22	Glass part., opaque, wash per	
Vending Machine	60	sq. ft.	3
Venetian Blinds (Standard)	210	Wall, painted, wash, per sq. ft.	9
Wastebaskets	15	Wall, vacuum, per sq. ft.	4.7
		Windows, wash, per sq. ft.	7.5

STANDARD JOB TIMES FOR FLOOR CLEANING OPERATIONS
Time in Minutes per 1,000 Sq. Ft.

Sweeping		Machine Scrub	
Unobstructed	9	Unobstructed	25
Slightly Obst.	10	Slightly Obst.	35
Obstructed	12	Obstructed	40
Heavily Obst.	16	Heavily Obst.	45
Dust Mopping		Machine Polish	
Unobstructed	7	Unobstructed	15
Slightly Obst.	9	Slightly Obst.	25
Obstructed	12	Obstructed	30
Heavily Obst.	16	Heavily Obst.	35
Damp Mopping		Vacuum - Wet Pick-Up	
Unobstructed	16	Unobstructed	20
Slightly Obst.	23	Slightly Obst.	27
Obstructed	27	Obstructed	31
Heavily Obst.	32	Heavily Obst.	35
Wet Mop and Rinse		Vacuum - Dry Pick-Up	
Unobstructed	35	Unobstructed	14
Slightly Obst.	45	Slightly Obst.	17
Obstructed	50	Obstructed	19
Heavily Obst.	55	Heavily Obst.	23
Hand Scrub		Strip and Rewax	
Unobstructed	240	Unobstructed	100
Slightly Obst.	300	Slightly Obst.	120
Obstructed	330	Obstructed	140
Heavily Obst.	360	Heavily Obst.	180
Hand-Scrub - Long Brush			
Unobstructed	75		
Slightly Obst.	105		
Obstructed	120		
Heavily Obst.	135		

To the work units time decided upon, add time for room preparation (moving, stacking and putting furniture back into its original position). Also add the time required to assemble and set up the equipment and clean it prior to storage.

Material in this Appendix was furnished through the courtesy of the New York Port Authority Maintenance Department.

APPENDIX C: SOURCES OF HANDY DEVICES

Problems come up from time to time in any historic building which may require heavy expenditure for equipment rental or may require access to spaces that are dangerous. There is a limit to the amount of equipment that can be kept on hand. Some items are used so seldom that it is not practical to buy them or they may be too expensive. It is a good policy to make friends with many of the local governmental and utility departments such as street, highways, sewer, fire and police, utility company personnel, and heavy building contractors. Many of them may develop an interest in the historic building itself. The time spent in showing the property to these people and explaining its significance to them may turn out to be helpful in times of need. The following table gives an indication of where certain equipment may possibly be obtained from these specialized users, hopefully for free, or at least at a greatly reduced rate.

POSSIBLE SOURCES FOR HANDY DEVICES							
ITEM	Local Fire Dept.	Util. Co.	High- way Dept.	Heavy Equip. Contr.	Bldg. Con.	Sewer	Misc.
Toilet, Portable		X	X		X		
Bulldozer		X	X	X			
Stump Cutter		X	X	X			A
Brush Chipper		X	X				A
Hose, Heavy Duty	X						
Backhoe, Tractor Mounted		X	X	X	X	X	
Shoring Timbers				X	X	X	
Sewer Cleaner						X	C
Septic Tank Pumping						X	C
Road Grader			X	X			
Fence Stretcher			X	X			
Rototiller Heavy Duty							A
Tree Spraying Equipment			X				A
Concrete or Mortar Mixer					X		
Scaffolding					X		
Cherry Picker	X	X					
Tar Kettle						X	B
Ladders	X	X	X		X		
Snake, Electric Pipe						X	C
Water Supply, Temporary	X			X			
Electrical Supply, Temporary		X					
Electrical Generator, Gas Driven		X			X		

A. Landscape Contractor

B. Roofing Contractor

C. Plumbing Contractor

APPENDIX D: SAMPLE FORMS

SURVEY FORM

Room Name _____	Number _____	Story _____
Floor Material _____	Key _____	area _____ s.f.
Floor Covering Matl. _____	Key _____	area _____ s.f.
Wall North Material _____	On _____ Key _____	area _____ s.f.
Wall South Material _____	On _____ Key _____	area _____ s.f.
Wall East Material _____	On _____ Key _____	area _____ s.f.
Wall West Material _____	On _____ Key _____	area _____ s.f.
Ceiling Material _____	On _____ Key _____	area _____ s.f.
Door Material _____	no. _____	area _____ s.f.
Windows Material _____	Type _____ no. _____	area _____ s.f.
Light Fixtures Matl. _____		no. _____ s.f.
Outlets Material _____		no. _____
Switches Material _____		no. _____

Heater Units Matl. _____	Type _____	no. _____ area _____ s.f.
Heater Grills Matl. _____		no. _____ area _____

FURNITURE

Type _____	Matl. _____	Key _____ no. _____
Type _____	Matl. _____	Key _____ no. _____
Type _____	Matl. _____	Key _____ no. _____
Type _____	Matl. _____	Key _____ no. _____
Type _____	Matl. _____	Key _____ no. _____
Waste Containers _____	Size _____	Key _____ no. _____

Use frequency: Day _____ Wk _____	Month _____	Approx. Hours/Yr. _____
Population: _____	Minimum _____	Maximum _____
Seasonal: Fall _____	Winter _____	Spring _____ Summer _____

WORK TIME ESTIMATE

Policing _____	Cleaning _____
Routine Cleaning Preparation _____	Cleaning _____
Periodic Cleaning Floor Damp _____	Wet _____
Periodic Cleaning Walls, Dusting _____	Washing _____
Periodic Cleaning Ceiling, Dusting _____	Washing _____
Room preparation, Floors _____	Walls _____ Ceiling _____

NOTES

MATERIAL KEY

H Historical material
 O Old material, not from the site
 N New material, common
 R New material, historic reproduction
 E Material substitution

Building _____
 Date _____

Surveyor _____

A. Items requiring periodic replacement.

B. Areas of special attention.

C. Hazards

D. Other

HOUSEKEEPING TIME ESTIMATE FORM

ITEM	TREATMENT	Area SF	TIME		Clean-Up	Times Per Year	Frequency Code	TOTAL TIME
			Preparation Set Up	Time Required				
1. _____								
2. _____								
3. _____								
4. _____								
5. _____								
6. _____								
7. _____								
8. _____								
9. _____								
10. _____								
11. _____								
12. _____								
13. _____								
14. _____								
15. _____								
16. _____								
17. _____								
18. _____								
19. _____								
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24. _____								
25. _____								
26. _____								
27. _____								
28. _____								
29. _____								
30. _____								
31. _____								
32. _____								
33. _____								
34. _____								
35. _____								
36. _____								
37. _____								
38. _____								
39. _____								
40. _____								
41. _____								

WORK SCHEDULE FORM

Page of
Date

SUPERVISOR

JOB

AREA

TYPE OF WORK

TIME OF WORK to

*Regular
Schedule:*

Job or work—con	Week 1					Week 2					Week 3					Week 4					Time
	Monday	Tuesday	Wednesday	Thursday	Friday	Monday	Tuesday	Wednesday	Thursday	Friday	Monday	Tuesday	Wednesday	Thursday	Friday	Monday	Tuesday	Wednesday	Thursday	Friday	
1																					
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
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23																					
24																					
25																					
26																					
27																					
28																					
29																					
30																					
31																					

WORK DISTRIBUTION FORM

Date _____
Page _____ of _____

SUPERVISOR _____
JOB _____
TYPE OF WORK _____
AREA _____
TIME OF WORK _____ to _____

Assignments:

List names	Time																		
	Daily	Weekly	Every other	Every four	Quarterly	Semi-annual	Annual	January	February	March	April	May	June	July	August	September	October	November	December
1																			
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			

AREA OF MATERIALS TO BE MAINTAINED BY TYPE - SUMMATION

Area Tabulation in square feet floor	KEY	UNITS	Room 1	Room 2	Room 3	Room 4	Room 5	Room 6	Room 7	TOTAL
Flooring		SF								
		SF								
		SF								
		SF								
Floor Covering		SF								
		SF								
		SF								
		SF								
Base		SF								
		SF								
Wall		SF								
		SF								
		SF								
Wall Covering		SF								
		SF								
Ceiling		SF								
		SF								
		SF								
Ceiling Covering		SF								
		SF								
		SF								
Trim		SF								
		SF								
		SF								
Windows		SF								
		SF								
Windows		No.								
Door		SF								
		SF								
Doors		No.								
Curtains		SF								
		SF								
Plaster Ceiling Paint		SF								
		SF								
Wood Ceiling		SF								
Total										

KEY: Historic material (H); Old material not from site (O); New material, common (N); New material, historic reproduction (R); Material substitution (E).

PERIODIC INSPECTION FORM⁴⁷

	<u>Good</u>	<u>Fair</u>	<u>Not Satisfactory</u>
A. General Areas			
1. General Cleanliness	_____	_____	_____
2. Grounds (litter free)	_____	_____	_____
a. Authenticity of landscaping	_____	_____	_____
3. Parking (litter free)	_____	_____	_____
a. Ample for visitation load	_____	_____	_____
4. Washrooms (cleanliness)	_____	_____	_____
a. Ample for visitation load	_____	_____	_____
5. Guides (staff personal appearance)	_____	_____	_____
B. Exterior of Historic Building - (Condition)			
1. Gutters and downspouts	_____	_____	_____
a. Water carried away from foundation	_____	_____	_____
2. Painted areas	_____	_____	_____
3. Glass and glazing	_____	_____	_____
4. Brick	_____	_____	_____
5. Mortar joints	_____	_____	_____
6. Siding (weatherboard, clapboards, board & batten, etc.)	_____	_____	_____
7. Roof	_____	_____	_____
8. Foundation (leaking?)	_____	_____	_____
9. Wood (trim, window frames, window sills, sash, cornice, etc.)	_____	_____	_____
10. Logs	_____	_____	_____
11. Sod (walls)	_____	_____	_____
12. Stone (walls)	_____	_____	_____
13. Fencing	_____	_____	_____
14. Walks	_____	_____	_____
C. Interior of Historic Building (condition)			
1. Structural (joists, beams, plates, rafter, etc.)	_____	_____	_____
2. Plaster	_____	_____	_____
3. Hardware	_____	_____	_____
4. Windows	_____	_____	_____
5. Doors	_____	_____	_____
6. Paint	_____	_____	_____
7. Wallpaper	_____	_____	_____
8. Floors & floor coverings	_____	_____	_____
9. Electrical system	_____	_____	_____
10. Plumbing system	_____	_____	_____
11. Heating plant	_____	_____	_____
12. House cleaning	_____	_____	_____
D. Site Protection			
1. Fire extinguishers	_____	_____	_____

	<u>Good</u>	<u>Fair</u>	<u>Not Satisfactory</u>
2. Night Security	_____	_____	_____
a. locks	_____	_____	_____
b. alarms	_____	_____	_____
c. lights	_____	_____	_____
d. etc.	_____	_____	_____
3. Daytime Security	_____	_____	_____
a. guides	_____	_____	_____
b. alarms	_____	_____	_____
c. barriers	_____	_____	_____
d. other	_____	_____	_____
4. Rodent devices	_____	_____	_____
5. Insect treatments	_____	_____	_____
 E. Miscellaneous			
1. Inventory			
a. objects properly numbered	_____	_____	_____
b. files in order and complete	_____	_____	_____
2. Office and Staff Area			
a. clean	_____	_____	_____
b. orderly	_____	_____	_____
c. safety	_____	_____	_____
3. Storage Areas (safe, clean & orderly)	_____	_____	_____
a. artifacts	_____	_____	_____
b. records	_____	_____	_____
c. equipment	_____	_____	_____
d. commodities/supplies	_____	_____	_____
4. Visitors areas and walks	_____	_____	_____
a. traffic control	_____	_____	_____
b. safety	_____	_____	_____
c. cleanliness	_____	_____	_____

Signature of person making evaluation

APPENDIX E: EXAMPLE OF PLANNING

The following example will help to illustrate the planning procedures described in this booklet. The property is the Simon Perkins' Mansion in Akron Ohio, which consists of two houses, four outbuildings, and approximately 9 acres of land. The mansion dates from 1835. The original owner was a large property holder and the father-in-law of John Brown, the abolitionist. The maintenance planning in this example is limited to the dining room; similar procedures would be used for the rest of the property.

The dining room is typical of the house in size and is somewhat remote from the visitors' entrance. The planning process is started by conducting a survey which inventories all surfaces and objects, using the Survey Forms and a sheet of graph paper for sketching the layout of the room.

The location of windows, doors, and fireplaces was sketched on the appropriate walls. Note that the doors are designated by a code consisting of "D" for door figure "5" which is the number of the room that the door swings into, and the letter "A", "B", or "C" indicating the consecutive count. The same system is used for window with the letter "W". A designation system saves time and words when making the survey. Note that door D08A opens into room 8 and the doors shown dotted are ones that have been removed. The furniture and the radiators are sketched in and labeled. The room dimensions are placed in the blank spaces.

At this point, completion of the Maintenance Survey Form can begin. Under floor material the fact that there are floor cracks is mentioned because it affects the cleaning. A vacuum would be better than a treated dust mop for dusting. The area of the floor is calculated from the dimensions on the room sketch. Each wall is treated separately because there may be occasions to note different coatings or coverings on some walls; for example the substrate may be plaster on one wall and brick or wood on the other. In wall calculations, doors and windows are not deducted, because in dusting and most washing they are included in the treatment. The calculation and recording of areas of surface will be of great value not only for housekeeping but for contract work and ordering materials. The furniture is briefly described. The key is the designations

(H - O - N - R - E) indicating character of material, which will be a clue to any restraints which may be required. The "Use Frequency" would not have to be filled in for each room if other spaces are used in the same way and have similar traffic. The amount of room used will be one of the criteria used in deciding on treatment frequency.

The work time estimates will be based on practical experience in the building or from estimates derived from published standards.

"Notes" is a place to record other items which affect housekeeping such as the number of small objects, the window coverings and the fact that the fireplace isn't used. The "Maintenance Survey" form is a listing of items which may break, wear out, or need adjustment. It will be a clue to inspection and stockpile planning. It also can serve as a list of future maintenance projects. The example used has interior blinds painted shut, window sash painted shut and the hardware trim painted in. The "Areas of Special Attention" is a listing of conditions which may indicate excessive wear or deterioration, and shows areas where preventative measures should be adopted. In the case of the example, deleterious signs were not evident.

When the surfaces have been measured and identified, the "Housekeeping Time Estimating Form" is filled out using as a guide the list included in "Planning the Frequency of Treatment." Note the order of listing; floors and other horizontal surfaces are listed first, next walls, ceilings, window coverings, etc. At this point in the process many hard decisions will have to be made as to frequency of treatment. Remember that, unless carefully planned, routine tasks such as floor dusting may be overdone at the expense of periodic treatments such as wall dusting. Corrections of this type of situation are one of the main dividends of maintenance planning. Units used in the time calculations are in minutes which are converted to hours.

The "Work Distribution Form" is an overview of the yearly work schedule. Its main function is to point out monthly, quarterly or longer periods of work frequency, which may be either combined into one project to save preparation time, or spaced out so that routine work and policing can still be done. For instance, wall and ceiling dusting and washing can be scheduled during January, a slow month for visitors. By combining a group of tasks,

room preparation can be reduced. One room preparation serves for several jobs. Window washing is combined with a certain amount of window sill washing, etc.

After the work is roughly distributed on a yearly basis the "Work Schedule Form" can be prepared. This can be filled out using an "X" in the block which indicates the day of the week the task is to be performed. However the example uses time in minutes so that total estimated time for the day can be calculated. Routine work is scheduled for a two day a week frequency. Because major periodic work is scheduled for Monday, Tuesday, and Wednesday of week 2, routine work for Friday of week 1 is eliminated. This process can be done for each room of the building or, if there are similar rooms, they can be treated alike. It is suggested that a sampling of different room types be done to verify the work time estimates by actual practice. The most crucial area is the entrance and the entrance matting. As soon as possible determine policing requirements for different weather condition. This can reduce floor dusting drastically in high traffic areas.

This planning process will be done several times before realistic schedules can be developed.

MAINTENANCE SURVEY FORM

Room Name DINING ROOM Number 5 Story FIRST
 Floor Material OAK 6" WIDE 1/2" CRACKS Key H area 279 s.f.
 Floor Covering Matl. NONE Key - area - s.f.
 Wall North Material PAINT On PLASTER Key N area 169 s.f.
 Wall South Material " On " Key N area 169 s.f.
 Wall East Material " On " Key - area 191 s.f.
 Wall West Material " On " Key - area 191 s.f.
 Ceiling Material " On " Key - area 279 s.f.
 Door Material WOOD, 6 PANEL 2-11" x 6-10 no. 2 area 42 s.f.
 Windows Material WOOD 36" x 76" Type D.H no. 2 area 36 s.f.
 Light Fixtures Matl. CAST BRASS, GLASS SHADE (O) no. 1 s.f.
 Outlets Material BRASS no. 2
 Switches Material " no. 1

RADIATOR COUPL 36" X 18" X 24"
 Heater Units Matl. METAL PAINTED Type - no. 2 area 12 s.f.
 Heater Grills Matl. NONE no. - area -

FURNITURE
 Type 5' P MAHOGONY TABLE Matl. WOOD Key H no. 1
 Type CHINA CAB, GLASS DOOR Matl. " Key O no. 3
 Type ETAGERE Matl. " Key O no. 1
 Type BIDE CHAIRS, RUSH SEAT Matl. " Key H no. 7
 Type HIGH CHAIR Matl. " Key O no. 1
 Waste Containers CROCKS (DISPLAY) Size 12" Ø Key O no. 3
SEE NOTES

Use frequency: Day 100 Wk 300 Month 1000 Approx. Hours/Yr. 700
 Population: Minimum 2 Maximum 60
 Seasonal: Fall 3 Winter 4 Spring 1 Summer 2

WORK TIME ESTIMATE
 Policing 2 MIN.
 Routine Cleaning Preparation 5 MIN. Cleaning 10 MIN
 Periodic Cleaning Floor Damp 14 MIN Wet NONE
 Periodic Cleaning Walls, Dusting 26 MIN Washing 240 720 SF
 Periodic Cleaning Ceiling, Dusting 26 MIN Washing 90
 Room preparation, Floors 5 MIN. Walls 60 MIN. Ceiling 90 MIN.

NOTES
DOOR TRIM 8" WIDE, BASE 15" HIGH X 66.9 LF = 84 SF

40 PIECES CHINA AND GLASS WARE ON OPEN SHELVING (O)
FIREPLACE, MARBELIZED STONE, STONE HEARTH & BENCH
NOT USED - NO PLASTER CRACKS
GLASS CURTAINS, NO SHADES OR DRAPES

MATERIAL KEY
 H Historical material
 O Old material, not from the site
 N New material, common
 R New material, historic reproduction
 E Material substitution
 Building PERKINS MANSION
 Date 11/16/74
 PAGE 1 of 3
 Surveyor J.H.C

MAINTENANCE SURVEY FORM

A. Items requiring periodic replacement.

Thumb Latches, No.	NONE	Condition	
Rim Latches, No.	NONE	Condition	
Mortice Locks, No.	2	* Condition	PAINTED IN
Door Hinges, No.	6	H Condition	" "
Door Adjustment	O.K.		
Sash Adjustment	OK		TOP SASH PAINTED IN
Sash Cord, Material	CORD	Condition	FAIL
Sash Lock, Material	BRASS	Condition	PAINTED
Sash Handle, Matl.	BRASS #2	Condition	"
Cabinet Work	NONE		
Door Hardware	"	Condition	
Door Hinges	"	Condition	
Cabinet Drawers	"	Operation	
Window Shade	NONE	Operation	
Blinds	WOOD	H Operation	PAINTED SHUT
Toilet Tank		Operation	
Toilet Tank		Condition	
Bath Tub		Operation	
Bath Tub		Condition	
Lavatories		Operation	
Lavatories		Condition	

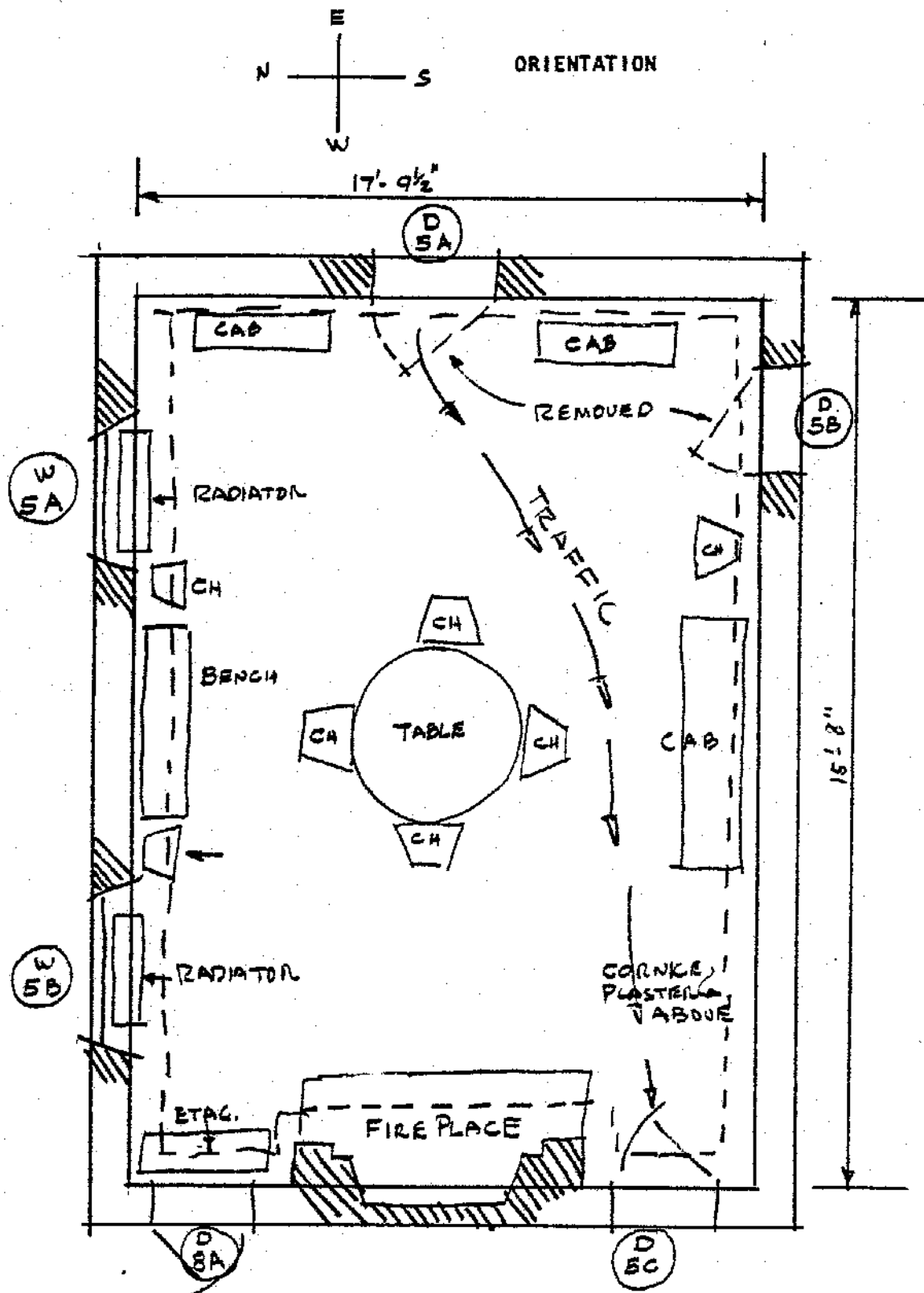
B. Areas of special attention.

High Traffic	THIRD ROOM FROM ENTRANCE
Floor Wear	NOT NOTICABLE
Wall Wear	" "
Moisture	" "
Rodents - termites	" "

C. Hazards

D. Other * LATE 19TH CENT. (2)

* MISSING W - 5B



ROOM NAME DINING ROOM # 5

CEILING HEIGHT 10'-9"

PAGE 3 OF 3

TIME ESTIMATE FORM FOR DINING ROOM

ITEM	TREATMENT	TIME IN MINUTES						TOTAL TIME
		Area SF	Preparation Set Up	Time Required	Clean-Up	Times Per Year	Frequency Code	
1. Oak Floor	Polishing	279	0	0	3	100	A	300
2. Dusting Vacuum		279	4	5	10	100	B	1900
3. Damp Mop		279	4	5	14	10	D	230
4. Window Sills	Dusting	3	-	.5	.5	100	B	50
5. Washing		3	3	2	2	4	E	28
6. Top of Win. & Dr.	Dusting	60	-	-	2	100	B	200
7. Window Washing			3	2	2	4	E	28
8. Top of Base	Dusting	672	3	-	4	100	B	700
9. Wall, Lt. Switch	Spot	10	-	-	.5	50	B	25
10. Radiator Cover	Dusting	20	-	-	.5	100	-	50
11. Walls	Dusting	720	60	60	26	10	D	1460
12. Washing		720	60	60	240	.5	G	180
13. Ceiling	Dusting	279	90	90	26	5	D	1030
14. Washing		279	90	90	90	.5	G	135
15. Brass	Dust	30	-	-	1	100	B	100
16. Polish		30	2	-	5	3	F	21
17. Glass Curtains	Wash	35		5	10	2	F	30
18. China & Glass	Dust	400	-	-	10	100	B	1000
19. Wash		400	5	10	60	4	E	300

Total Time Minutes
 $\div 60 =$ Hours
 Hours Per Square Foot 2.17

7767
 129

WORK SCHEDULE FORM

Page of
Date 11/15/74

JOB AREA DINING ROOM
TYPE OF WORK TIME OF WORK 11/4/75 to 2/1/75

Regular
Schedule:

Job or work-con	Week 1					Week 2					Week 3					Week 4					Time
	Monday	Tuesday	Wednesday	Thursday	Friday	Monday	Tuesday	Wednesday	Thursday	Friday	Monday	Tuesday	Wednesday	Thursday	Friday	Monday	Tuesday	Wednesday	Thursday	Friday	
1 FL POLISHING	3					3					3					3					3
2 " DUSTING	19					19					19					19					19
3 " DAMP MOP						23															23
4 WDSILL DST	1					1					1					1					1
5 " WASH						7															7
6 WDRACE DUST	2					2					2					2					2
7 WINDOWS WASH						7															7
8 BASE DUST	7					7					7					7					7
9 LTRSW SPOT	.5					.5					.5					.5					.5
10 RAD. CN. DUST	.5					.5					.5					.5					.5
11 WALLS DUST						146															146
12 " WASH						206															206
13 CEILING DUST						210															210
14 " WASH																					
15 BRASS DUST																					1
16 " POLISH						7															
17 CURTAINS WASH																					
18																					
19																					
20																					
21																					
22																					
23																					
24																					
25																					
26																					
27																					
28																					
29																					
30																					
31																					
TOTAL	33					406	450	201	33		32		33		32						33

WORK DISTRIBUTION FORM

Date 11/15/74
Page 1 of 1

SUPERVISOR _____
JOB _____
TYPE OF WORK _____
AREA DINING ROOM
TIME OF WORK 11/1/75 to 12/31/75

Assignments:

List names	Daily	Twice weekly	Weekly	Every other	Every three	Every four	Quarterly	Semi-annual	Annual	January	February	March	April	May	June	July	August	September	October	November	December	Time
1 Floor Polishing	X																					3
2 " Dusting	X																					19
3 " Damp mop																						23
4 Wd. sill dusting	X																					1
5 Wash																						7
6 TP Wd. on dust	X																					2
7 Window wash																						7
8 Base dust	X																					7
9 Lt. switch spot		X																				5
10 End cover dust	X																					5
11 Walls dust																						146
12 " Wash																						360
13 Ceilings dust																						206
14 " Wash																						270
15 Brass dust	X																					1
16 " Polish																						7
17 Curtains wash																						15

APPENDIX F: ORGANIZATIONS

Advisory Council on Historic Preservation, 1522 K Street, NW.
Suite 430, Washington, D.C. 20005.

Agricultural History Society, U.S. Department of Agriculture,
500 Twelfth Street SW., Washington, D.C. 20250.

American Anthropological Association, 1703 New Hampshire
Avenue NW., Washington, D.C. 20009.

American Antiquarian Society, 185 Salisbury Street,
Worcester, Massachusetts 01609.

American Association for State and Local History, 1400
Eighth Avenue, South, Nashville, Tennessee 37203.

American Association of Museums, 2233 Wisconsin Avenue NW.
Suite 200, Washington, D.C. 20007.

American Canal Society, Canal Museum, Weighlock Building,
Erie Boulevard East, Syracuse, New York 13202.

American Historical Association, 400 A Street SE. Washington,
D.C. 20003.

American Institute of Architects, 1735 New York Avenue NW.
Washington, D.C. 20006.

American Institute of Building Design, 408 Hathaway Building,
7120 Adyvenhurst Avenue, Van Nyes Airport, California
91406.

American Institute of Interior Designers, 730 Fifth Avenue,
New York, New York 10019.

American Institute of Maintenance, 710 West Wilson Avenue,
Glendale, California 91209.

American Institute of Planners, 1776 Massachusetts Avenue, NW.
Washington, D.C. 20036.

American Scenic and Historic Preservation Society, 19 West Street, New York City, New York 10005.

American Society for Planning Officials, 1313 East 60th Street, Chicago, Illinois 60615.

American Society of Civil Engineers, 345 East 47th Street, New York City, New York 10017.

American Society of Landscape Architects, 1759 Old Meadow Road, McLean, Virginia 22101.

American Society of Mechanical Engineers, 345 East 47th Street, New York City, New York 10017.

American Studies Association, Bennett Hall, University of Pennsylvania, Philadelphia, Pennsylvania 19104.

Association for Living Historical Farms and Agricultural Museums, Smithsonian Institute, 12th and Constitution Avenue NW, Washington, D.C. 20256.

Association for Preservation Technology, Post Office Box 2487, Ottawa, Ontario, K1P 5W6, Canada.

Association for Study of Negro Life and History, 1407 14th Street NW, Washington, D.C. 20001.

Brownstone Revival Committee, Room 1825, 230 Park Avenue, New York City, New York 10017.

Early American Industries Association, Old Economy, Ambridge, Pennsylvania 15003.

Historical Society of Early American Decoration, Post Office Box 894, Darlan, Connecticut 06820

Institute for Early American History Culture, Post Office Box 220, Williamsburg, Virginia 23185.

Friends of Cast Iron Architecture, 44 West 9th Street, New York City, New York 10011.

History of Science, c/o R. Stuewer, Secretary, 81 Grove Street, Belmont, Massachusetts 02178.

National Association for Housing and Redevelopment Officials, 1600 Virginia Avenue NW, Washington, D.C. 20037.

National Council on the Humanities, 806 15th Street NW,
Washington, D.C. 20506.

National Endowment for the Arts, One McPherson Square,
Washington, D.C. 20506.

National Park Service, U.S. Department of the Interior,
18th and C Streets NW, Washington, D.C. 20240.

National Trust for Historic Preservation, 740 Jackson
Place NW, Washington, D.C. 20006.

Organization of American Historians, 112 North Bryan Street,
Bloomington, Indiana 47401.

Pioneer American Society, 620 South Washington Street, Falls
Church, Virginia 22406.

Society of Architectural Historians, 1700 Walnut Street,
Room 716, Philadelphia, Pennsylvania 19103.

Society for Historical Archeology, Moravian College,
Bethlehem, Pennsylvania 18018.

Society for Industrial Archeology, Room 5020, Division of
Mechanical and Civil Engineering, National Museum
of History and Technology, Smithsonian Institution,
Washington, D.C. 20560.

Society for the History of Technology, Sears Library, Room
554, Cleveland, Ohio 44106.

Society of American Archeology, 1703 New Hampshire Avenue NW,
Washington, D.C. 20009.

State Historic Preservation Officers, complete list available
from the Office of Archeology and Historic Preservation,
National Park Service, U.S. Department of the Interior,
Washington, D.C. 20240.

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